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Sarah Frohnweiler, Charles Atanga Adongo, Bernd Beber,
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Abstract

We use a randomized controlled trial to examine the short- and mid-term impacts of a best-practice training program on (non-)employment outcomes in Ghana. Overall the program did not affect core labor market outcomes at the extensive (employment) and intensive (hours of work, income) margin, but it (i) induced occupational sorting, with treated individuals more likely to work in their field of specialization, (ii) partially improved job quality (written contracts, medical benefits), and (iii) led to better outcomes on a variety of non-labor market indicators (mental health, delayed marriages, access to finance). We also explore policy stakeholders' expectations and perceptions of program success. We find that stakeholders (i) have overly optimistic prior beliefs about the program's impact on core outcomes and (ii) do not update their beliefs as we would expect from Bayes' rule when presented with information about the program's circumscribed effectiveness. We speculate that this result suggests an obstacle for adaptive programming in development cooperation and could help explain the persistence of some suboptimal labor market interventions.

JEL-Codes: C93, I21, J08, J24, J28, O12, O15

Keywords: Vocational training; labor markets; skills; youth; women; impact evaluation; Ghana

August 2024

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1. Introduction

Skills training programs are widely regarded as key policy instruments to combat the high levels of youth un(der)employment, high rates of informality, and skills shortages in Sub-Saharan Africa (ILO 2022; World Bank 2013, 2019). But while policymakers advocate for a prioritization of improved access to vocational training (AUC and OECD 2024; United Nations and Development 2015) and tend to offer optimistic assessments of the efficacy of these programs (Hirshleifer et al. 2016), the empirical evidence is mixed (McKenzie 2017). Recent reviews suggest that perhaps only 'optimally' designed programs are likely to produce positive employment or earning effects (Agarwal and Mani 2024; Carranza and McKenzie 2024; Kluve et al. 2019).

Against this backdrop we evaluate a youth skills training program in Ghana that included several best-practice design features (Agarwal and Mani 2024; Carranza and McKenzie 2024; Kluve et al. 2017) such as (i) a combination of theoretical and on-the-job training by experienced institutions and craftspersons, (ii) targeting of disadvantaged youths, and (iii) a multipronged approach combining training with elements such as mentoring, monthly stipends, and job placements. The program's aim was to teach in-demand, market-relevant skills by closely collaborating with private sector companies. More specifically, the program, known as N4G, provided young girls and women with intensive training (between 2 and 6 months) in the fields of Beauty Therapy, Dressmaking, or Hairdressing.[1]

Employing a randomized controlled trial (RCT) that included 1,300 women, we examine program impacts on labor market and other outcomes six and eighteen months after training completion. We find that for the average participant, N4G did not lead to meaningful improvements with respect to core labor market outcomes at the extensive (employment) and intensive (hours of work, income) margins. Though average effect sizes are consistently positive, the obtained coefficients are small and statistically insignificant. However, subgroup analysis using heterogeneous treatment effect specifications suggests sizeable positive impacts of N4G among participants who registered for Dressmaking, the field in which training lasted longest and was conducted by the largest establishments. Here we observe raised levels of skill acquisition, larger professional networks, higher rates of employment, and higher income.

Aside from N4G's muted overall effects on core labor market outcomes, we find that the program did have important effects on three other types of outcomes. First, it seems to have led to occupational sorting, with treated subjects more than twice as likely to work in their field of specialization (Dressmaking, Beauty Therapy, Hairdressing) than non-treated subjects. Second, we see a rise in job quality, with treated women more likely to have a written labor contract (by 7.4 ppt) and medical benefits (5.4 ppt). Third, N4G positively affected quality-of-life indicators such as anxiety (down by 3.4 ppt) and stress (down by 0.9 ppt), marriage rates (delayed by 8.0 ppt), and access to a bank account (up by 6.8 ppt).

With our impact evaluation showing mixed labor market and welfare impacts of N4G, we next ask how our results compare to stakeholders' expectations and how stakeholders might update in response to a presentation of our results. For this purpose, we elicited prior (pre-presentation) and posterior beliefs about program success from implementers and program staff. First, we find that program stakeholders' prior beliefs strongly overestimate N4G's impact on core labor market outcomes. We show that overestimation is driven both by (i) being overly optimistic regarding labor market outcomes of training participants and (ii) being excessively pessimistic regarding labor market outcomes of non-participants. Second, we combine the informative priors of stakeholders with the results from our experimental data to show how stakeholders would update their beliefs if they followed Bayes' rule. We then compare these Bayesian posteriors to the actual posteriors of stakeholders that were elicited after stakeholders saw a presentation of the evaluation results.

1. N4G stands for *Network for Enterprise Development Learning through Sewing for Girls*. The program was implemented by the German Agency for International Cooperation (GIZ), in collaboration with local partners in Ghana.

Results show that stakeholders do not follow Bayesian updating, but update their priors only very selectively if at all.

Our paper advances the relevant literature in four ways. First, we contribute to the body of work that examines the effects of skills and job training programs. With respect to core labor market outcomes, we sound a note of caution amid optimism regarding best-practice, optimally designed programs (Adoho et al. 2014; Alzúa et al. 2021; Attanasio et al. 2011; Bandiera and Goldstein 2010; Bandiera et al. 2020; Carranza and McKenzie 2024; Chakravarty et al. 2019; Datta et al. 2018; Maitra and Mani 2014; McKenzie 2017). Promises of job creation and higher earnings for vulnerable population groups remain difficult to keep, even for seemingly well-designed programs such as N4G.

Second, we add correlational evidence on program and implementation features that shape program effectiveness. Although the N4G training was to a certain degree standardized, the program took place in different regions of Ghana, in different occupations, and was implemented by different providers. We observe substantial effect heterogeneity across occupations and providers, and our findings support the view that the impact of job and skills training programs are strongly context-specific.

Third, we add to the scarce literature on the effects of skills training programs on non-employment outcomes in vulnerable populations. Considering that one of the principal goals of these programs is often to improve welfare in the target population, little empirical evidence exists regarding job quality and mental health outcomes. While a few studies have looked at formalized employment relationships and written contracts (Attanasio et al. 2011; Bandiera et al. 2023), studies considering access to medical insurance and benefits have to our knowledge only been conducted in developed countries (e.g., Hendra et al. 2016). Similarly, some existing work has estimated effects on job satisfaction and general well-being (e.g., Adoho et al. 2014; Hirshleifer et al. 2016; McIntosh and Zeitlin 2022), but not on mental health (anxiety, depression, and stress), as we do here.

Lastly, we link to the literature on beliefs in labor markets and among policymakers. An emerging literature has documented that jobseekers and trainees (Abebe et al. 2024; Bandiera et al. 2023; Banerjee and Sequeira 2023; Chakravorty et al. 2024) as well as employers (Abebe et al. 2024; Caria and Falco 2024) tend to hold biased beliefs about the impact of job training and that they only slowly (or not at all) update their prior beliefs, potentially exacerbating search and matching frictions. In this regard we provide empirical evidence from another type of stakeholder, i.e., staff from training institutes and a development aid agency. We find similarly inaccurate beliefs and incomplete updating of priors. Here we are embedded in the new but rapidly growing literature on distorted beliefs among policymakers (Abadie 2020; Andrews and Shapiro 2021). Several studies have examined the (in)accuracy of policymakers' beliefs and expectations (DellaVigna and Pope 2018; DellaVigna et al. 2019; Groh et al. 2016; Hirshleifer et al. 2016; Iacovone et al. 2023; McKenzie 2018), but we additionally assess how priors change in response to new information. A recent study with Brazilian mayors (Hjort et al. 2021) showed that these elected officials substantially updated their beliefs when given new information. In contrast, we observe little updating in our context of a development cooperation program. We argue that contrary to the claim that research studies should "approximate the target context as closely as possible to maximize the chance that their results are taken up by policymakers" (Vivalt et al. 2024), policymakers do not update appropriately when they receive the maximum possible customized results, i.e., evaluation results of their own programs.

The remainder of the study is structured as follows. In Chapter 2, we provide additional details on vocational training in Ghana in general and the evaluated training program in particular. Chapter 3 outlines our experimental design and data. Chapter 4 describes our estimation strategy. Chapter 5 presents the effects of the N4G training six and eighteen months after program completion and discusses their robustness and mechanisms of the effects. In Chapter 6, we discuss how the evaluation results compare to policymakers' expectations, and in Chapter 7, we offer concluding remarks and policy recommendations.

2. Study context

2.1. Vocational training in Ghana

After eleven years of universal basic education students in Ghana can either continue general education at a Senior High School (SHS) or opt for vocational skills training. The latter offers two main options: Technical and Vocational Education and Training (TVET), or an apprenticeship program which has no formal requirements in terms of prior educational qualifications.

Informal apprenticeships are the most prevalent way to learn vocational skills in a specific occupation, accounting for 80-90% of all basic skills training in Ghana according to CTVET (2020). These apprenticeships are typically conducted under a master craftsperson, are not formally regulated, and do not have fixed curricula but primarily consist of learning by doing without theoretical foundations (Hardy and McCasland 2023). Apprentices often pay an entrance fee, have to cover their material and tool expenses, and are usually unpaid or receive meagre wages. The duration varies around a median of three years. Upon completion, apprentices get a signed testimonial from the master craftsperson, which is not recognized beyond the immediate community where the apprenticeship took place. Apprentices can also sign up for examinations with the National Vocational Training Institute (NVTI), which evaluates only practical skills and provides nationally recognized occupation-specific certificates at different proficiency levels (CTVET 2020; Hardy and McCasland 2023; Palmer 2009).

The remaining 10-20% of vocational training occurs at formal TVET institutes. According to the 2023 Annual Household Income and Expenditure Survey (AHIES) in Ghana, only 17-18% of the individuals working in Dressmaking, Beauty Therapy, or Hairdressing report having attended a TVET institution (GSS 2023). Service delivery is highly fragmented and institutes differ concerning ownership, national accreditation, duration, and costs. These programs follow a school-based approach (CTVET 2020) and most take place exclusively at the training institute. Although some formal apprenticeship programs combine theoretical instructions in the training centers with on-the-job training, these programs are much less popular (Palmer 2009). Government-owned institutes tend to be nationally accredited, offer training of longer duration, and do not charge fees but require expenses for school uniforms and materials. Often, they get criticized for their poor link to the industry's demand and low-quality instructions in general due to inadequate teacher training and a lack of instructional infrastructure (CTVET 2020; Dadzie et al. 2020). A recent report reveals that only 30% of the trainers have company-based work experience in the occupation they teach (AUC and OECD 2024). Instead, private institutes tend to offer shorter training, are often conducted by large establishments in the respective occupation, and charge high tuition fees in addition to uniforms and material.[2] Nationally accredited institutes must adhere to approved curricula meeting quality standards set by the regulating authority, the Commission for Technical and Vocational Education and Training (CTVET).

Irrespective of completing a vocational skills training at any TVET institute or an apprenticeship with a master craftsperson, everyone can sign up for examinations with the National Vocational Training Institute (NVTI), which evaluates only practical skills and provides nationally recognized occupation-specific certificates at different proficiency levels (CTVET 2020).

2.2. The N4G program

The N4G program was a tuition-free vocational skills training program in Ghana administered by the German Agency for International Cooperation (GIZ) Ghana in collaboration with the Ghanaian

2. Fees strongly vary depending on the institute and duration of the offered programs. Programs with a duration of six months can cost between 1,500 and 3,500 GHS excluding material.

non-profit organization Samira Empowerment and Humanitarian Projects (SEHP).[3] Through a public tender process, GIZ Ghana selected six training providers in selected occupations within the "fashion industry" – Dressmaking, Beauty Therapy, and Hairdressing – spanning the metropolitan cities of Accra, Kumasi, and Tamale. GIZ Ghana and SEHP selected the occupations and locations based on a preceding study of market conditions and skill constraints in the Ghanaian fashion industry.

Providers were paid per filled training slot, out of which they paid each trainee the material and a monthly stipend of 200 GHS.[4] All providers had to develop and follow a training curriculum. After training completion, at least 70% of the trainees had to be hired by the providers or placed with other companies. The first N4G training sessions started in September 2021, while other sessions began only in November and December 2021. The last training groups finished in July 2022. Table 1 gives an overview of the distribution of the available N4G training slots across regions, occupations, and training providers.

Table 1. Training providers and training capacity of N4G.

	Dressmaking	Beauty Therapy	Hairdressing	Total
Accra	Provider 1 100 slots Provider 2 100 slots	Provider 5 100 slots	Provider 5 100 slots	400
Kumasi	Provider 3 100 slots	Provider 6 25 slots	Provider 6 50 slots	175
Tamale	Provider 4 100 slots	Provider 6 25 slots	Provider 6 50 slots	175
Total	400	150	200	750

Note: The table shows the distribution of slots across providers, occupations, and regions.

The design of the N4G program stands out from the previously mentioned training opportunities by blending the purely practical approach of an (informal) apprenticeship with the more structured and formalized approach of institutionalized training programs in a highly condensed format. Training was provided by established master craftspersons in their business premises, preserving the hands-on experience and the direct link to industry. At the same time, the pre-defined curricula with theoretical elements aimed at a more structured training with clear learning outcomes. The compact N4G program thus resembled the high-cost training programs delivered by private providers. Unlike privately offered training, N4G was offered for free and even included monthly stipends, thereby drastically reducing participants' opportunity costs of training participation.

3. Experimental Design

3.1. Sample recruitment

Registration for the N4G program took place through community events organized by SEHP in cooperation with community leaders and religious institutions between April and November 2021. Interested women stated their basic socio-demographic characteristics to identify eligibility. Only

3. N4G formed part of the development cooperation initiative "Decent Work for a Just Transition" launched in 2018 by the German Federal Ministry for Economic Cooperation and Development (BMZ). The initiative aimed to create up to 100,000 good jobs and improve working conditions in eight African partner countries (Ghana, Côte d'Ivoire, Egypt, Ethiopia, Morocco, Rwanda, Senegal, and Tunisia). While the focus on employment and skills development is nothing new in German development cooperation, the initiative emphasizes a demand-driven approach to skills development and close collaboration with the private sector.

4. Approximately halfway through the program duration, stipends were increased to 350 GHS per month for the training offered in Accra and Kumasi due to increased transportation costs.

women aged 16 to 24 years with at most a completed senior high school degree, no prior training participation within the fashion industry, and no childcare responsibilities were allowed to register.[5] In total, 3,938 women registered for N4G, but only 1,445 fulfilled the eligibility criteria.

Afterwards, eligible women attended a career day, where they received additional information about the occupations covered by N4G, including content and duration, and could participate in career guidance and counseling services. At the career day, they had to complete a second, more comprehensive survey capturing their employment and living situation. In this survey, eligible women also registered for their preferred occupation, in which to receive the training.[6]

We randomized access to the N4G training among registered and eligible women (details in Chapter 3.2) and training started with a delay that varied between a couple of weeks and a couple of months. Six months after the N4G training finished, between July and September 2022, all eligible women were re-contacted for the first follow-up. Due to the delayed training start of some providers, the time lag between training completion and follow-up varies between one and 49 weeks. However, the large majority (90%) of beneficiaries were interviewed more than 14 weeks after training completion. A second follow-up survey was conducted eighteen months after training completion among study participants who registered for Dressmaking. Figure 1 summarizes the sequence of all program and data collection activities.

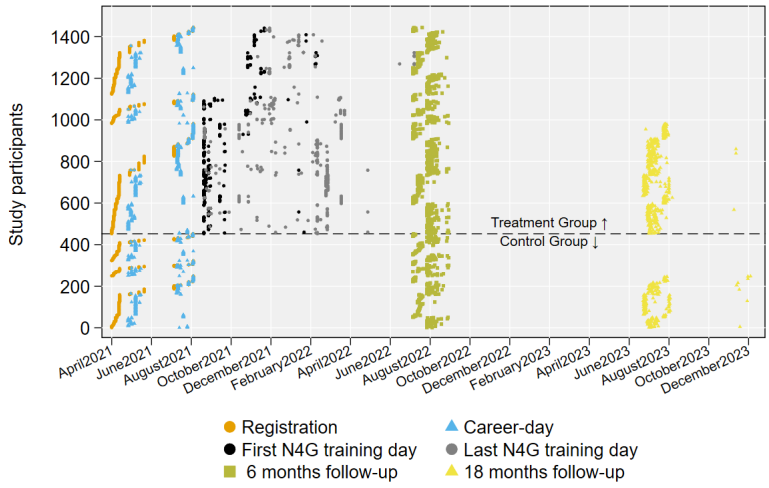

FIGURE 1. Sequence of the intervention.
Notes: The figure shows the timing of the events related to the N4G program evaluation for all study participants. The y-axis represent the number of study participants. The first 452 observations belong to the control group, the upper 993 observations belong to the treatment group who received access to N4G. The x-axis displays the sequence of the different steps of the evaluation, i.e., the registrations, the career days, the first and last attended N4G training days, and the six- and eighteen-months follow-up surveys.

3.2. Randomization

Our program evaluation relies on an over-subscription design for the 750 N4G training slots. 1,445 of the women who completed the two-stage registration process fulfilled the eligibility criteria for N4G and they were randomly allocated into a treatment (793 women), a waitlist (200 women), and

5. These criteria were set by the program implementers, GIZ Ghana and SEHP. All study participants gave written consent to participate in the survey and have their contact details be used for follow-up interviews and the anonymized data for research purposes. Further, they were informed that only a random subset of registered women will get invited to participate in the N4G training program.

6. In Accra, women could additionally register for Fashion Accessories and in Tamale for Yarn Weaving. As these occupations were not offered across all regions and the number of registered women was limited, they are excluded from the impact evaluation. All eligible women registered for Fashion Accessories in Accra and Yarn Weaving in Tamale were invited to participate in the N4G training.

a control group (452 women). Randomization was stratified by city, registered occupation (women would only be enrolled into the occupation they registered for), employment status, education, level of self-efficacy, and whether the person has a smartphone. To ensure that all training slots get filled and to factor in a potential non-take-up, the treatment group was larger than the control group and we created a waitlist for each training provider. For the analysis, we do not differentiate between treatment and waitlist because everyone on the waitlist was contacted to participate in N4G. Women were informed about their treatment status through individualized text messages sent between August and October 2021 and follow-up calls by training providers.

3.3. Data

Data come from five sources: (1) a two-stage baseline survey consisting of the registration and career-day surveys, (2) a first follow-up survey conducted on average six months after program completion among all study participants, (3) a second follow-up survey conducted only among participants who registered for Dressmaking approximately eighteen months after program completion, (4) administrative data from GIZ Ghana, and (5) a two stage expert survey conducted with N4G stakeholders.

The baseline and follow-up surveys were very similar in their content. They included questions on basic demographic characteristics, education, employment situation, living conditions, mental health, personality traits, as well as migration. The baseline survey additionally covered questions about preferences over and expectations towards the N4G training and the six-months follow-up about self-reported participation in the N4G program.

Administrative data from GIZ include the attendance sheets that training participants had to sign when attending the training. We further know if N4G participants underwent an assessment from the National Vocational Training Institute (NVTI) to obtain a Proficiency I certificate.[7] The attendance sheets only contain women's first name and surname, the name of the training provider, and sometimes miss the training date. The NVTI assessment lists only contain women's first name, surname, and occupation. Due to overlapping names and spelling inconsistencies, merging the information from the attendance and NVTI assessment sheets is incomplete.

Lastly, we conducted an expectation elicitation survey with GIZ employees and N4G training providers. Both interviews took place after the N4G program completion to ensure that varying assumptions on program implementation and participant characteristics do not distort expectations. We interviewed stakeholders before and after informing them about the impact evaluation results. Questions covered stakeholders' expectations of N4G study participants' employment outcomes.

In addition to these primary data sources, we use secondary data from the 2015 Labor Force Survey, the 2017 HIES Living Standard Survey, the 2021 Population and Housing Census, and the 2023 Annual Household Income and Expenditure Survey (AHIES) for background information on the Ghanaian context (GSS 2015, 2017, 2021, 2023).

3.4. Summary statistics

Table 2 shows summary statistics for our overall sample and separately by treatment and control group. Women in our sample are on average 21 years old, 41% are married, and 20% already have at least one child. The large majority has either completed junior high school (31%) or senior high school (42%). Most study participants are unemployed (78%) and employed participants have an average monthly income of USD 38.85 and work 48.11 hours per week. Reflecting the distribution of available training slots, more than half of the respondents registered in Accra and for Dressmaking.

Except for the registration region and educational attainment, all socioeconomic characteristics and outcome variables at baseline are balanced across treatment status. In Tamale, many women

7. The testing department of NVTI conducts nationwide certification for over 80 skilled areas for formally (individuals who went through formal vocational and technical training) and informally (individuals who acquired their skills directly from workshops, craftspersons, etc.) trained people. Exams take place twice per year and have a registration fee of 180 GHS (approx. 20 USD) which was covered by GIZ for the trainees of N4G.

registered for relatively few available training slots, whereas in Accra fewer women registered for a relatively high number of slots. At the same time, participants in Tamale have on average lower educational levels while participants in Accra have higher educational levels. Thus, treatment probability is higher among participants in Accra (lower in Tamale) and therefore among those with higher educational levels. However, educational levels are balanced when controlling for region fixed effects.

Table 2. Balance at baseline.

	Control (1)	Treatment (2)	Overall (3)	Difference (4)	p-value (5)	Female population	(6)
Socioeconomic characteristics at baseline							
Age	20.58	20.63	20.61	-0.04	0.72		19.8
	(0.10)	(0.07)	(0.06)	(0.12)			
Married binary	0.41	0.41	0.41	0.00	0.90		0.26
	(0.02)	(0.02)	(0.01)	(0.03)			
Has children	0.21	0.21	0.21	0.01	0.79		0.22
	(0.02)	(0.01)	(0.01)	(0.02)			
Highest completed education:							
None	0.08	0.05	0.06	0.03	0.05		0.05
	(0.01)	(0.01)	(0.01)	(0.01)			
Primary	0.25	0.18	0.20	0.06	0.01		0.24
	(0.02)	(0.01)	(0.01)	(0.02)			
JHS	0.29	0.32	0.31	-0.03	0.20		0.57
	(0.02)	(0.01)	(0.01)	(0.03)			
SHS	0.39	0.44	0.43	-0.05	0.05	$\geq$ SHS	0.15
	(0.02)	(0.02)	(0.01)	(0.03)			
Main outcomes at baseline							
Paid employment	0.18	0.20	0.19	-0.02	0.34		0.26
	(0.02)	(0.01)	(0.01)	(0.02)			
Paid wage-employment	0.11	0.14	0.13	-0.03	0.19		0.23
	(0.02)	(0.01)	(0.01)	(0.02)			
Paid self-employment	0.06	0.06	0.06	0.00	0.78		0.03
	(0.01)	(0.01)	(0.01)	(0.01)			
Unpaid employment	0.04	0.03	0.03	0.01	0.34		-
	(0.01)	(0.01)	(0.00)	(0.01)			
Monthly income (employed)	34.81	40.59	38.85	-5.78	0.40	... (15-24 years)	68.37
	(4.22)	(4.10)	(3.14)	(6.84)			
Weekly hours (employed)	45.94	49.04	48.11	-3.10	0.25	... (15-24 years)	33.4
	(2.26)	(1.47)	(1.23)	(2.69)			
Written contract	0.05	0.10	0.08	-0.05	0.17		0.04
	(0.02)	(0.02)	(0.02)	(0.03)			
Distribution across program components at baseline							
Region: Accra	0.48	0.61	0.57	-0.14	0.00		-
	(0.02)	(0.02)	(0.01)	(0.03)			
Region: Kumasi	0.20	0.20	0.20	0.00	0.83		-
	(0.02)	(0.01)	(0.01)	(0.02)			
Region: Tamale	0.32	0.19	0.23	0.13	0.00		-
	(0.02)	(0.01)	(0.01)	(0.02)			
Trade: Dressmaking	0.55	0.53	0.54	0.02	0.54		-
	(0.02)	(0.02)	(0.01)	(0.03)			
Trade: Beauty therapy	0.29	0.32	0.31	-0.04	0.16		-
	(0.02)	(0.01)	(0.01)	(0.03)			
Trade: Hairdressing	0.16	0.14	0.15	0.02	0.33		-
	(0.02)	(0.01)	(0.01)	(0.02)			
Joint F-stat.	-	-	-	-	0.394		-
N	452	993	1,445	1,445			

Note: Table shows averages for baseline using all observations. Observations with partially missing information on baseline characteristics, baseline outcomes, and attriters were kept. The values displayed for the differences are the differences in means across control and treatment group and their standard errors in parentheses. The p-values belong to a joint orthogonality test on the treatment arms. Values displayed for F-stat are F-statistics for joint significance of all balance variables. The numbers in column (6) are based on microdata from the Ghana Population and Housing Census from 2021. Data on the monthly income and weekly working hours among employed is retrieved from the HIES Living Standards Survey 2017.

As N4G targeted a very specific part of the Ghanaian population our sample is quite homogeneous and only includes women aged between 16 to 24 at the time of registration in 2021. Column (6) of Table 2 indicates the average characteristics of the total Ghanaian female population aged between 16 to 24 years based on data from the Population and Housing Census from 2021 (GSS

2021) and the HIES Living Standard Survey from 2017 (GSS 2017). In terms of age, proportion with own children, and employment status women who registered for N4G are very similar to the total female Ghanaian population within the same age range. Women who registered for N4G are, however, more likely to be married and have a higher level of education. The small share of women who indicated to be working at the time of registration report considerably lower monthly incomes but more working hours than their gender- and sex-specific counterparts in the total population.

While Table 2 includes all 1,445 eligible women that were part of the baseline, the sample reduces to women who were interviewed at least twice. Across occupations and regions, our final study sample covers 1,300 observations (901 treatment, 399 control) for the short-term effects six months after training completion and 692 observations (472 treatment, 220 control) for the mid-term effects eighteen months after completion.[8] In Chapter 5.3 we test for differential attrition and assess if our results are robust to using inverse probability weighting.

4. Estimation strategy

We estimate the intent-to-treat (ITT) effects of the N4G program on (non-) employment outcomes using the following ANCOVA specification for individual i in survey wave $t = 1, 2$:

$$Y_{i,1} = \beta N4G\_assigned_i + \gamma Y_{i,0} + \delta_{r(i)o(i)} + \varepsilon_i, \tag{1}$$

where $Y_{i,1}$ is the outcome of interest and $N4G\_assigned_i$ is an indicator for individual i being randomly assigned to treatment, i.e., the N4G training. We control for the pre-treatment outcome $Y_{i,0}$ when available and providing enough variation.[9] We additionally control for region-occupation fixed effects, $\delta_{r(i)o(i)}$. The average treatment effect of the information treatment is given by β. As randomization is at the individual level, we use robust standard errors. We report unadjusted p-values alongside adjusted q-values accounting for multiple hypothesis testing. In Chapter 5.3 we show robustness of the main results for additional covariates, inverse probability weighting (IPW), and Romano-Wolf adjusted p-values.

We also estimate the average-treatment-effect (ATE) for compliers. We use dummies for training start and training completion and a continuous measure of training intensity measured as self-reported training days in model 1 and instrument them with random treatment assignment. These additional IV approaches account for the fact that not all individuals invited to participate in N4G started, completed, or received training for the same amount of time through the N4G program.

Our outcome variables contain a variety of indicators of participants' employment and job attributes. We assess whether individuals are working, their type of employment, employment duration, weekly working hours, and monthly income. We differentiate between employment in any occupation and employment in the occupation selected upon registration. Concerning job attributes of participants' main job we assess formality, fringe benefits, and job satisfaction. Additionally, we are interested in individuals' general quality of life by assessing mental health, family situation, and access to finance. Table A.II.1 lists the definition and source of all variables of the analysis.

In addition to measuring the overall impact of the N4G program, we are interested in exploring the heterogeneity of impacts to help understand whether certain training designs had larger impacts, or whether women with certain characteristics benefit more from training. We will further look at employment transitions over time. We assess heterogeneity with respect to program design, training providers, and baseline employment through sample splits. For heterogeneity across other individual characteristics, i.e., age, education, marital status, and own children at baseline we use interaction models. The experimental design, the ITT and ATE specifications, the outcome variables, as well

8. We follow the definition of the most recent literature review on vocational and apprenticeship training programs from Agarwal and Mani (2024) who define evaluations after 12 months or less as short-term and evaluations after more than 12 months as mid-term.

9. Due to the low employment rates at baseline, we follow the approach of other studies (e.g., Attanasio et al. 2011) and set employment related baseline variables to zero if participants are unemployed at baseline. Instead, for data collected during the follow-ups, employment related variables are missing if participants are unemployed.

as the mechanisms discussed in Chapter 5.6 were specified in the pre-analysis plan (AEARCTR-0007967).[10]

5. Effects of the N4G program

5.1. Descriptive statistics and training take-up

Table 3 shows that being invited to participate in the N4G training increased treated women's probability of starting the N4G training by 57.3 percentage points and their probability of completing the N4G training by 47.8 percentage points.[11] Among women of the control group, no one indicated to have started the N4G training and Appendix Figure A.I.1 shows that only a very small share of the control group (6.8%) started and an even smaller share (1.0%) completed another vocational training program. However, the attendance sheets show that one woman who registered for Hairdressing in Accra and was assigned to the control group started the N4G training but attended only 8 training days. In Chapter 5.3.3 we discuss potential spillovers of the N4G training.

Table 3. Effect of treatment assignment on treatment take-up.

	N4G training attendance				
	Self-reported			Attendance sheets	
	Started	Completed	Training days	Started	Training days
	(1)	(2)	(3)	(4)	(5)
N4G treatment (assigned)	0.573	0.478	39.002	0.551	28.418
	(0.017)	(0.017)	(1.666)	(0.018)	(1.166)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1,300	1,300	1,289	1,332	1,332
Control mean	0.000	0.000	0.000	0.002	0.019
Occupation x Region FE	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on the probability to start the N4G training (columns (1) and (4)), the probability to complete the N4G training (column (2)), and the attended training hours (columns (3) and (5)). Columns (1) to (3) are based on self-reported responses from study participants collected at the 6-months follow-up. Columns (4) and (5) are based on the administrative data. Models include occupation-region fixed effects. Robust standard errors are displayed in parentheses and p-values in squared brackets.

The small differences in the coefficients for starting and completing the N4G training point out that the biggest difficulty for the N4G training was that many women did not start the N4G training, even though everyone expressed interest and invested time for the registration process. Once women started the N4G program, the large majority also completed the training. Treatment take-up and retention differs across occupations. Appendix Table A.I.1 shows that take-up is substantially larger for the sample of Dressmaking (increase in training start by 65.4 percentage points) than for the sample of Beauty Therapy and Hairdressing (increase by 48.0 percentage points). Differences also exist across providers of the same occupation. Take-up rates within Dressmaking vary between 81% for the Dressmaking training in Tamale and 47% for one of the Dressmaking providers in Accra (Appendix Figure A.I.2).

Low take-up rates and discontinued training participation are common difficulties of training programs. Reviewing take-up rates of recent training-related RCTs implemented in low- and middle-income countries show take-up rates often fluctuating around 50% (e.g., Adoho et al. 2014; Alzúa et al. 2021; Bandiera et al. 2020; Groh et al. 2016; Hardy and McCasland 2023) and rarely achieving

10. Additionally, we pre-registered household assets, health insurance status, financial transfers, and transactional sex as outcome variables and their results are included in Appendix VII.

11. Appendix Figure A.I.1, however, shows that take-up rates among individuals on the waitlist were substantially lower than among individuals who got directly assigned to training which suggests that training providers were less rigorous in contacting waitlisted individuals.

rates of up to 90% (e.g., Honorati 2015; Osman and Speer 2022). Completion rates are usually substantially lower. The take-up and completion rates of the N4G program lie within the usual participation rates but the program stands out due to almost no training participation in the control group. Frohnweiler (2024) discusses the determinants of participation in the N4G training in more detail and evaluates an intervention to address low participation rates.

The duration of the N4G training was announced to be six months for Dressmaking and two months for Beauty Therapy and Hairdressing. Column (3) of Table 3 shows that treated women report having attended on average 39 training days more than control women. When instead relying on the administrative data of the attendance sheets, column (5) reports an increase by 28 training days. Appendix Table A.I.1 confirms that also according to the attendance sheets participants of the Dressmaking training attended substantially more training days (42.4) than participants of Beauty Therapy or Hairdressing (11.5).

The exact number of training days was not specified a priori and varies across providers of the same occupation. Appendix Figure A.I.4 displays the maximum number of offered training days (vertical line) and the distribution of trainees' attended training days (bars) as recorded in the attendance sheets for each training provider. The maximum number of delivered training days varied between 49 and 125 days for Dressmaking (Panel A), seven and 37 days for Beauty Therapy, and 69 and 77 days for Hairdressing. Success in retaining trainees also differed across training providers. While the announced training duration of six months was almost uniformly implemented by all Dressmaking providers, retention varied substantially (Appendix Figure A.I.3). For Beauty Therapy and Hairdressing, retention played a minor role but many invited women did not start the training and the training duration varied substantially between providers. In Accra and Tamale, the Beauty Therapy training was offered for the announced two months, it lasted only one week in Kumasi. The training in Hairdressing approximately lasted the announced two months in Accra but was substantially longer in Kumasi and Tamale.

The N4G program further required training providers to place at least 70% of their trainees upon training completion. The left graph of Appendix Figure A.I.5 shows that only 21.6% (107 out of 493) of the treated subjects who started the N4G program received a job placement offer. The right graph further reveals that most of these placements was done by providers of Dressmaking, but especially in Kumasi, many participants did not accept the offers. The long distance to the location of the offered job was the most prominent reason why participants declined the placement offer.

5.2. Short-term effects

5.2.1. Effects on labor market performance. We begin by looking at the overall impact of the N4G program on employment outcomes approximately one and a half years after registering for the N4G program and approximately six months after the N4G program finished. Table 4 shows the ITT effects for the pooled sample, i.e., across occupations and regions, on study participants' employment probability (columns (1) to (5)) and income (columns (6) and (7)). In Panel A, the outcome variables consider employment and income in any occupation. Panels B and C follow the approach by Autor et al. (2014) and decompose total employment into two additive and mutually exclusive channels by the occupation of participants' main job at the time of the follow-up. We distinguish between employment in the occupation for which participants had expressed interest in when registering for the N4G training (Panel B) and employment in any other occupation (Panel C).[12]

Over the course of our study, we observe a substantial increase in employment. While at baseline only 18.5% of the participants had a paid job, 34.1% of the participants are employed for a pay one and a half years later, i.e., in our six-months follow-up. However, these shares are almost identical

12. In Panel B, outcome variables are set to zero for individuals working outside the registered occupation at the time of the follow-up. In Panel C, outcomes are set to zero for individuals working inside the registered occupation. For unemployed individuals, outcomes are always zero. Similar approaches are applied for example in Alfonsi et al. (2020); Attanasio et al. (2011).

for treated and control subjects. Accordingly, the small and insignificant coefficients in Panel A show that being invited to the N4G program did not affect participants' employment probability.[13] But, Panel B and C reveal that N4G generated a sectoral shift of employment into the occupation for which participants registered to receive the training in. Treated individuals are 9.2 percentage points more likely to be working in the occupation for which they expressed interest at registration. Likewise, treated individuals are 5.8 percentage points less likely to be working in other occupations. In absolute terms, the program equally increased participants' probability to be wage- and self-employed in the registered occupation but in relative terms, i.e., compared to the control mean, the effect is much stronger for self-employment.

We observe the same pattern for income. Across occupations, treated and control participants do not differ in terms of their monthly income. Separating the outcomes by occupation, however, shows that N4G significantly increased monthly incomes in the registered occupation (+ USD 3.99) which by construction goes along with a significant reduction in incomes outside the registered occupation in the total study sample.

Effect sizes almost double when looking at the IV results of having started or having completed the N4G program as well as when assessing the effect of training intensity (Appendix Table A.III.1). For the sake of brevity and due to the similarity in results across all outcome variables, we subsequently concentrate on the OLS results.

Table 4. Effect on employment probability and income.

	Employment probability					Income	
	Total employment (1)	Paid employment (2)	Wage-employed (3)	Self-employed (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
Panel A: Economic activity in any occupation							
N4G treatment (assigned)	0.038	0.035	0.003	0.032	0.003	1.333	0.602
	(0.030)	(0.029)	(0.026)	(0.018)	(0.022)	(1.745)	(1.670)
	[0.205]	[0.226]	[0.921]	[0.075]	[0.879]	[0.445]	[0.719]
	{0.247}	{0.262}	{0.582}	{0.155}	{0.582}	{0.422}	{0.535}
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Control mean, base	0.226	0.185	0.115	0.070	0.040	7.616	7.358
Control mean, 6 months	0.491	0.341	0.253	0.088	0.150	13.198	12.549
Panel B: Economic activity inside registered occupation							
N4G treatment (assigned)	0.116	0.092	0.049	0.043	0.023	3.988	3.284
	(0.024)	(0.018)	(0.016)	(0.010)	(0.018)	(0.899)	(0.804)
	[0.000]	[0.000]	[0.002]	[0.000]	[0.201]	[0.000]	[0.000]
	{0.001}	{0.001}	{0.012}	{0.001}	{0.247}	{0.001}	{0.001}
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Control mean, base	0.010	0.003	0.003	0.000	0.008	0.022	0.001
Control mean, 6 months	0.168	0.068	0.058	0.010	0.100	1.507	1.373
Panel C: Economic activity outside registered occupation							
N4G treatment (assigned)	-0.078	-0.058	-0.046	-0.011	-0.020	-2.687	-2.695
	(0.027)	(0.026)	(0.023)	(0.016)	(0.013)	(1.565)	(1.520)
	[0.004]	[0.025]	[0.045]	[0.478]	[0.120]	[0.086]	[0.077]
	{0.020}	{0.070}	{0.116}	{0.447}	{0.188}	{0.166}	{0.155}
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Control mean, base	0.216	0.183	0.113	0.070	0.033	7.615	7.335
Control mean, 6 months	0.323	0.273	0.195	0.078	0.050	11.691	11.176
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on employment probability and income among all study participants. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses, p-values are displayed in squared brackets, and sharpened q-values are displayed in curly brackets.

13. The treatment coefficient on paid self-employment is only significant at the 10% level and loses it's significance when correcting for multiple hypothesis testing.

We also explore the quality of employment among employed participants.[14] Table 5 displays regression results for (1) hourly income among all employed participants, (2) hourly income among employed participants with a positive income, (3) weekly working hours, (4) employment duration, (5)-(8) job attributes in participants' main job, and (9) job satisfaction in participants' main job.

The N4G program did not significantly affect how employed participants perform in terms of hourly income, working hours, nor tenure.[15] The negative but insignificant coefficient for tenure suggests that control subjects found jobs slightly earlier while treated subjects were still in training. But, treated individuals are more likely to be in more formal employments and thus to benefit from several fringe benefits. They are 7.4 percentage points more likely that their main job provides a written contract and 5.4 percentage points more likely that it provides medical benefits. Although the absolute increases are relatively small, they are substantial in relative terms given the small shares in the control group (23.7% for written contract and 6.7% for medical benefits).[16] No significant differences exist regarding the probability that the main job contributes to a pension or offers paid off-days. The increase in job quality reflects in an increase of job satisfaction by 0.055 points on a scale from 0 to 1 compared to the control mean.

We interpret these findings as evidence that the N4G program targeted participants at the transition time into employment. Employment rates strongly increased over time but at an almost identical rate for treated and untreated study participants. Instead, N4G granted treated participants access to employment in their occupation of interest and under improved working conditions to which untreated participants have no access.

Table 5. Effect on job attributes among employed.

	Inc/hr	Inc>0/hr	Hours	Tenure (months)	Written contract	Medical benefits	Pension	Paid days off	Job satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N4G treatment (assigned)	0.037	0.053	-1.031	-0.313	0.074	0.054	0.030	0.035	0.055
	(0.035)	(0.048)	(1.852)	(1.279)	(0.040)	(0.027)	(0.021)	(0.035)	(0.023)
	[0.293]	[0.275]	[0.578]	[0.807]	[0.064]	[0.045]	[0.164]	[0.308]	[0.016]
	{0.292}	{0.283}	{0.482}	{0.536}	{0.136}	{0.107}	{0.214}	{0.296}	{0.052}
Observations	674	471	674	638	536	543	543	543	674
Control mean, base	0.200	0.263	13.714	5.674	0.025	.	.	.	0.324
Control mean, 6 months	0.181	0.261	50.526	13.870	0.237	0.067	0.049	0.153	0.345
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on job attributes among study participants that are employed at the time of the 6 months follow-up. Models include occupation-region fixed effects and the outcome measured at baseline if available. Outcome variables refer to the main job and are set to zero for unemployed individuals. Participants who are self-employed are excluded from the regressions in columns (5) to (8). Robust standard errors are displayed in parentheses, p-values are displayed in squared brackets, and sharpened q-values in curly brackets.

5.2.2. Effects on quality-of-life. Our second main set of outcomes links to study participants' living conditions. Results are presented in Table 6 which shows the effect on participants' wellbeing and mental health (columns (1) to (4)), their family situation (columns (5) to (8)), and financial access (columns (9) to (12)). Being invited to participate in the N4G program significantly reduces women's self-reported levels of anxiety (0.03 percentage points or 9.7% of the control group mean), depression (0.03 percentage points or 9.5%), and stress (0.01 percentage points or 14.3%) on a scale from 0 to 1. With regards to general well-being, treated and control individuals rank themselves

14. Even though this conditions the sample on one of our main outcomes, this is common practice to assess employment quality (e.g., Abebe et al. 2021; Alfonsi et al. 2020). Further, endogeneity concerns might be less severe in our setting given that the N4G program did not affect treated participants' overall employment probability.

15. To measure tenure, we asked about the month and year in which they started their current job. For individuals who did not remember the month of the employment start we set the month to January. The control mean and effect size remain almost identical if we instead use the average region-wave-year-specific reported month for missing information on the month. For individuals who are unemployed at the time of the interview we set the employment duration to zero.

16. These low rates are confirmed by ILO (2021) reporting that in 2020 only 17.4% of the African population was covered by at least on social protection benefit which compares to a global average of 47%.

almost identically in the center of the available scale. Invitees of the N4G program are significantly less likely to be married (8.0 percentage points or 14.0%). The lower levels measured among treated individuals regarding the probability of having children, being pregnant, or living in the same house as the partner are not significant in the overall sample.

Table 6. Effect on quality-of-life.

	Mental health				Family				Finances			
	Wellbeing (1)	Anxiety (2)	Depression (3)	Stress (4)	Marriage (5)	Has Children (6)	Pregnancy (7)	Living w/ partner (8)	Financial indep. (9)	Bank account (10)	Mobile money (11)	SuSu (12)
N4G treatment (assigned)	-0.007	-0.034	-0.027	-0.009	-0.080	-0.009	-0.014	-0.019	-0.011	0.068	0.006	-0.002
	(0.015)	(0.017)	(0.016)	(0.004)	(0.029)	(0.016)	(0.015)	(0.020)	(0.026)	(0.022)	(0.019)	(0.025)
	[0.646]	[0.050]	[0.096]	[0.011]	[0.005]	[0.597]	[0.361]	[0.353]	[0.655]	[0.003]	[0.768]	[0.936]
	{0.671}	{0.095}	{0.157}	{0.034}	{0.022}	{0.644}	{0.435}	{0.435}	{0.671}	{0.015}	{0.692}	{0.778}
Observations	1,300	1,195	1,195	1,195	1,299	1,300	1,300	1,281	1,300	1,300	1,300	1,300
Control mean, base	.	0.268	0.256	0.049	0.417	0.211	0.000	0.113	0.098	0.095	0.714	0.138
Control mean, 6 months	0.525	0.352	0.285	0.063	0.570	0.268	0.083	0.213	0.261	0.195	0.830	0.256
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on mental health and living conditions among all study participants. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses, p-values are displayed in squared brackets, and sharpened q-values are displayed in curly brackets.

Regarding access to finance, treated women are 6.8 percentage points more likely to have an active bank account, a substantial increase of 34.9% relative to the low share in the control group. No effects are observed on financial independence, the probability of having a mobile money account, or the probability of being part of a saving scheme (SuSu).

5.3. Robustness checks

5.3.1. Multiple hypothesis testing. Even though our outcome variables were pre-specified, we want to make sure that the effects of the N4G program on employment, employment quality, and livelihoods do not – partially – reflect chance differences due to multiple hypothesis testing. We applied q-values based on the two-stage procedure suggested by Benjamini et al. (2006) which are displayed in curly brackets in all regression tables. None of our main results loses its significance. Additionally, we control for multiple hypothesis testing using the step-down procedure of Romano and Wolf (2016) for each group of outcomes. Appendix Table A.VI.1 compares the original (column 1), re-sampled (column 2), Romano-Wolf (column 3), and Holm's (column 4) p-values for all outcome variables. They key outcome variables continue to be significant.

5.3.2. Attrition. Out of the 1,445 eligible women who registered for N4G in the baseline 146 (10.1%) could not be re-interviewed in the six-months follow-up in 2022 and out of the 779 subjects who registered for Dressmaking 87 (11.2%) could not be re-interviewed in the eighteen-months follow-up in 2023. We first check if treatment status affected attrition. Appendix Table A.VI.2 shows that attrition is balanced across treatment status in both follow-ups.

Then we assess if attrition is balanced regarding women's baseline characteristics. Appendix Table A.VI.3 reveals that women who drop out are younger, less likely to be married, more likely to have children, have lower education, and have a higher monthly income. In the eighteen-months follow-up, attrition is substantially higher in Accra and lower in Tamale while other baseline characteristics are comparable.

Lastly, we combine the to previous tests and check if treatment assignment induced selective attrition regarding baseline characteristics. We regress sample attrition on women's baseline characteristics, fully interact the regression with the randomly assigned treatment status, and compute the joint F-statistic of all interaction terms. For both follow-ups, the joint F-statistic is around 1.2 and their p-values are insignificant.

To address the observed selective attrition by baseline characteristics as potential source of bias, we repeat the estimations on all outcomes but include inverse probability weights. The results are summarized in Appendix Tables A.VI.4, A.VI.5, and A.VI.6 and show that the earlier results on employment, employment quality, and quality-of-life remain robust.

5.3.3. Spillovers. The registration process for the N4G program took place in form of community events with participants coming from the same or neighbouring communities. Some participants already knew each other before the registration. During the registration events women waited in the same locations to be registered and attended the same career guidance and counselling sessions. Thus, the N4G training program could have caused three different types of spillover.

First, registered women assigned to the control group might have been informed about the start and location of the training because they knew women assigned to the treatment group who shared the information with them. When interviewed in the six-months follow-up, none of the women assigned to the control group indicated that she started the N4G training. The attendance sheets list only one woman of the control group who started the N4G training in Hairdressing in Accra. However, she attended only 8 training days. We conclude that this first type of spillover has – if anything – played a negligible role.

Second, women who participated in the N4G training might have shared their experiences and gained knowledge with friends who are part of the N4G control group. We cannot rigorously estimate the relevance of this type of spillover because we did not collect information on the pre-treatment networks of our study participants. As a second best solution, we asked all participants at the six-months follow-up if they know someone who participated in N4G. Among treated women, 67.5% indicate that they know someone (else) who participated in N4G. The share increases to 85.0% if looking at treated women who report that they started the N4G training. Among untreated women, 56.0% indicate that they know someone who participated. In the smaller city Tamale, women are more likely to know someone who participated in N4G, whereas in the substantially bigger cities of Accra and Kumasi women are less likely. Once we control for region-occupation FE, untreated women who do not know someone who participated in N4G and untreated women who know someone are perfectly balanced in terms of individual baseline characteristics. Thus, in the next step we compare employment outcomes of control participants depending on whether they know someone who participated in N4G or not. Appendix Table A.VI.7 shows that women in the control group who know an N4G participant are more likely to be in paid employment (9.7 percentage points), less likely to be in unpaid employment (9.0 percentage points), and report a higher monthly income from their main job (4.4 USD) than untreated women who do not know an N4G participant. Effect sizes are almost identical to the effects of the N4G program on treated women's employment outcomes in the registered occupations. Even though the two sub-samples are balanced regarding observable baseline characteristics, knowing an N4G participant strongly depends on individuals' general network and personality traits that likely correlate with labor market performance. Thus, the results cannot be interpreted causally but rather as suggestive evidence that the N4G training might have had positive spillovers on women in the control group. In this case, our results would rather be a lower bound of the N4G training's actual effect on the employment outcomes of participants.

On the other hand, N4G might also have caused negative spillovers if the training induced changes in market tightness, also referred to as general equilibrium effects. Treated women whose employment opportunities in the registered occupation increased as a result of the training might have displaced women from the control group. For general equilibrium effects to materialize, a training program must have a critical size. Therefore, we express the N4G training capacity as a share of employment in the local and occupation specific labor markets that were targeted by N4G. We approximate locality- and occupation-specific employment using data from the 2021 Ghana

Population Census (GSS 2021) and the 2023 AHIES (GSS 2023).[17] The 750 training slots of N4G account for a share of 1.6% of the employment in the local and occupation specific labor markets of N4G, i.e., women aged 16 to 24 years living in targeted districts and working in Dressmaking, Beauty Therapy, or Hairdressing. Given this low share and interactions with training providers we do not expect the N4G program to have generated general equilibrium effects.

5.3.4. Additional controls. In an alternative specification we control for age, marital status, employment status, and education as additional baseline characteristics. Although baseline differences are insignificant, including pre-treatment characteristics can increase the precision of the estimates, may help control for any remaining (unobservable) imbalances, and assess if results remain robust to this alternative specification. Appendix Tables A.VI.8, A.VI.9, and A.VI.10 display the short-term results on the total sample and coefficients are very similar.

5.4. Heterogeneous treatment effects

5.4.1. The importance of program design and provider characteristics. Previous evaluations of vocational training suggest that program design and provider quality are important indicators for success (e.g., Brown et al. 2024; Hardy and McCasland 2023). The N4G training was announced to last six months for Dressmaking and two months for Beauty Therapy and Hairdressing. Further, the training in Dressmaking was implemented by larger formalized companies experienced in curriculum-based training programs, whereas providers of Beauty Therapy and Hairdressing were mostly small shop owners who prior to N4G primarily engaged in the traditional and rather informal apprenticeship system. At registration, participants knew about the differences in the training's overall duration. The training intensity and providers were, however, still unknown. While this might not have been ideal for training take-up, it rules out that study participants self-selected into an occupation based on provider characteristics. We first assess how treatment effects differ across program design and second how they differ across providers.

Figure 2 plots the ITT coefficients and 90% confidence intervals when running program design-specific regressions on the main outcomes.[18] While the N4G program's impact on the sectoral shift can be observed in both designs, effects are more pronounced for the Dressmaking training. Further, the effects on job quality, mental health, marriage, and banking observed in the total sample are almost exclusively driven by the training in Dressmaking. For Dressmaking, we additionally observe an overall increase in paid employment irrespective of the occupation (7.9 percentage points), an increased probability to have a job that contributes to a pension (6.7 percentage points), and a reduced probability to be pregnant (4.2 percentage points), and living with the partner (5.5 percentage points). In general, the effect sizes for the Dressmaking sample are substantially larger than when looking at the total sample. Despite these muted effects of the training in Beauty Therapy and Hairdressing, the increase in job satisfaction observed in the overall sample is driven by participants who registered for Beauty Therapy or Hairdressing which, however, seems to be an isolated effect.

As the N4G program's impacts are largely concentrated on Dressmaking, we limit the subsequent provider-specific analysis to providers of Dressmaking (Appendix Figure A.III.1). The majority of

17. For a more accurate assessment, we would look at district and occupation specific vacancy data. However, as in many low- and middle-income countries with high levels of informal employment, vacancy data are not available. Looking at the current size of the district and occupation specific labor market is therefore the best alternative available. The N4G training took place in three Ghanaian cities – Accra, Kumasi, and Tamale. The mobilization and registration events took place in 16 districts in Greater Accra, 7 districts in the Ashanti region (Kumasi), and 2 districts in the Northern region (Tamale). It is unlikely that women living outside these districts heard about the N4G training and registered for it. The program's eligibility criteria further reduced the population that could register to women between the ages of 16 and 24. The census data provides us with the number of women aged between 16 to 24 living in the districts based targeted by N4G. The AHIES data provide information on the proportion of women aged between 16-24 years working in (i) Dressmaking and (ii) Beauty Therapy and Hairdressing. A breakdown by district is not possible, but only by region.

18. The corresponding regression tables can be found in Appendix Tables A.III.2, A.III.3, and A.III.4.

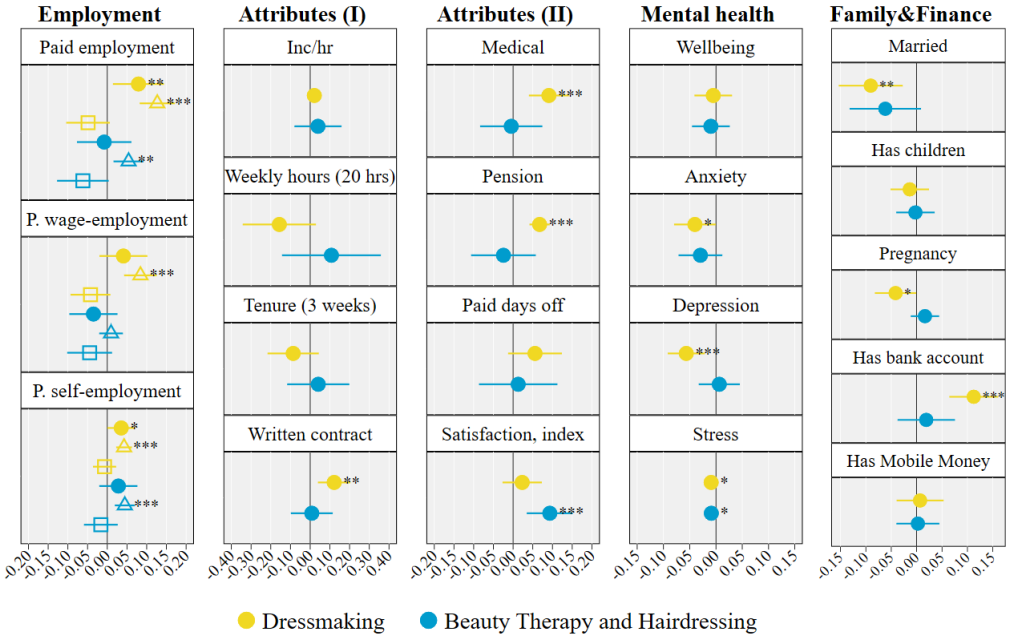

FIGURE 2. Short-term effects by program design.
Notes: The figure show the results of OLS regressions for the sub-samples of individuals who registered for Dressmaking (yellow) and Beauty Therapy or Hairdressing (blue).

the effects detected for the training in Dressmaking are driven by the provider in Tamale for whom we also detected the largest take-up and completion rates (Appendix Figure A.I.3). In contrast, effects are mostly insignificant and some even negative for the provider in Kumasi where take-up, completion, and training intensity were low and, most importantly, lower than for the other Dressmaking providers. For the two providers in Accra, we detect some significant positive effects across all outcome categories, but the effects' magnitude tends to be substantially smaller than for the provider in Tamale. This, again, mirrors the providers' take-up and completion rates lying in-between the high-performance-provider in Tamale and the low-performance-provider in Kumasi but an overall longer training duration.

Overall, program design and provider quality seem to have been crucial for the N4G program's success. The effects are largely concentrated on Dressmaking which was scheduled for six months and implemented by larger formalized companies experienced in curriculum-based training programs. Instead, Beauty Therapy and Hairdressing was scheduled for two months, and providers were mostly small shop owners who prior to N4G primarily engaged in the traditional and rather informal apprenticeship system. Nevertheless, longer duration does not strictly go along with more pronounced program impacts. Study participants invited to the training in Tamale experienced much larger benefits in terms of access to the occupation of interest, employment quality, and general livelihood than participants in Accra even though the maximum number of offered training days was 23 and 58 days less than of the two providers in Accra. Take-up and retention rates of trainees seem to be additional important success factor, likely mirroring providers' ability or willingness to account for trainees' special needs.

5.4.2. The role of participant characteristics. Next, we examine whether the average treatment effects mask heterogeneity across individuals' baseline characteristics. Table 7 assesses effect differences across individuals' baseline employment to better understand the employment transitions induced by the N4G program. It displays the effects on participants' probability to have a paid employment (columns (1) to (3)), paid wage-employment (columns (4) to (6)), paid self-employment (columns (7) to (9)), and unpaid employment (columns (10) to (12)). For each outcome the first column looks at employment in any occupation, the second column at employment in the registered occupation, and the third at employment outside the registered occupation. While Panel A covers

the total study sample, Panel B reduces the sample to those that were employed at baseline, and Panel C to those that were unemployed at baseline. The effects on employment in the registered occupation that we observed in the total sample (Panel A) are primarily driven by subjects that were unemployed at the time of the baseline (Panel C). When distinguishing between paid wage- and self-employment, we see that while those who were unemployed at baseline are more likely to find wage-employment, those who were employed at baseline are more likely to be self-employed in response to the N4G training.

TABLE 7. Employment transitions.

	Paid employment			Wage-employed			Self-employed			Unpaid employment		
	Any (1)	Inside (2)	Outside (3)	Any (4)	Inside (5)	Outside (6)	Any (7)	Inside (8)	Outside (9)	Any (10)	Inside (11)	Outside (12)
Panel A: Total sample												
N4G treatment (assigned)	0.036	0.116	-0.080	0.006	0.050	-0.044	0.027	0.043	-0.016	0.003	0.023	-0.020
	(0.031)	(0.024)	(0.028)	(0.027)	(0.016)	(0.023)	(0.018)	(0.010)	(0.016)	(0.022)	(0.018)	(0.013)
	[0.240]	[0.000]	[0.004]	[0.820]	[0.002]	[0.063]	[0.137]	[0.000]	[0.312]	[0.898]	[0.218]	[0.120]
	{0.355}	{0.001}	{0.018}	{0.596}	{0.013}	{0.174}	{0.289}	{0.001}	{0.454}	{0.598}	{0.332}	{0.288}
Observations	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Control mean	0.491	0.168	0.323	0.253	0.058	0.195	0.088	0.010	0.078	0.150	0.100	0.050
Panel B: Employed at baseline												
N4G treatment (assigned)	-0.013	0.114	-0.127	-0.039	0.049	-0.088	0.007	0.020	-0.013	0.019	0.045	-0.026
	(0.061)	(0.045)	(0.060)	(0.063)	(0.038)	(0.057)	(0.045)	(0.020)	(0.042)	(0.042)	(0.032)	(0.029)
	[0.837]	[0.013]	[0.036]	[0.539]	[0.198]	[0.125]	[0.871]	[0.311]	[0.764]	[0.649]	[0.156]	[0.366]
	{0.289}	{0.001}	{0.106}	{0.495}	{0.017}	{0.332}	{0.196}	{0.001}	{0.471}	{0.596}	{0.546}	{0.332}
Observations	291	291	291	291	291	291	291	291	291	291	291	291
Control mean	0.678	0.178	0.500	0.400	0.089	0.311	0.156	0.022	0.133	0.122	0.067	0.056
Panel C: Unemployed at baseline												
N4G treatment (assigned)	0.051	0.116	-0.065	0.021	0.052	-0.031	0.034	0.050	-0.016	-0.005	0.013	-0.018
	(0.035)	(0.027)	(0.030)	(0.029)	(0.018)	(0.025)	(0.019)	(0.011)	(0.016)	(0.025)	(0.022)	(0.014)
	[0.143]	[0.000]	[0.031]	[0.463]	[0.003]	[0.215]	[0.076]	[0.000]	[0.333]	[0.846]	[0.534]	[0.195]
	{0.596}	{0.048}	{0.113}	{0.546}	{0.332 }	{0.288}	{0.596}	{0.454}	{0.596}	{0.596}	{0.293}	{0.475}
Observations	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
Control mean	0.437	0.165	0.272	0.210	0.049	0.162	0.068	0.006	0.061	0.159	0.110	0.049
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on employment probability for different sub-samples of our study population. Panel A includes all study participants, Panel B is restricted to study participants that were employed at the time of the baseline, and Panel C is restricted to study participants that were unemployed at the time of the baseline. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses, p-values in squared brackets, and adjusted q-values in curly brackets.

Appendix Tables A.III.5, A.III.6, and A.III.7 display how the significant impacts found for the overall N4G training vary across participants' age, education, family situation, and employment status at baseline. Most of the effects on employment, employment quality, and quality-of-life are concentrated among older participants (21-24 years). Further, the effects on employment, mental health, and finances seem to be more pronounced among more educated participants. Participants family status plays a less clear-cut role on the treatment effects. These findings match with anecdotal feedback from N4G training providers claiming that younger participants tend to be "less serious" and that less educated women have difficulties in taking measurements and pattern drafting due to limited literacy and numeracy skills.

5.5. Mid-term effects

The follow-up data collection conducted approximately eighteen months after program completion among subjects who registered for Dressmaking sheds light on the persistence and evolution of the N4G program's effects. Figure 3 summarizes and compares the treatment effects for the subsample of Dressmaking in the six- and eighteen-months follow-up.[19]

Over time, the effects on employment probability and income increased. Eighteen months after program completion, the treated Dressmaking subsample is 14.5 percentage points more likely to have a paid employment (35.0% compared to the control mean), which is entirely driven by a higher probability to be employed in Dressmaking (increase by 16.9 percentage points). The largest share of this increased employment can be attributed to an increase in wage-employment. A delayed

19. The corresponding regression tables can be found in Appendix Tables A.III.8, A.III.9, and A.III.10.

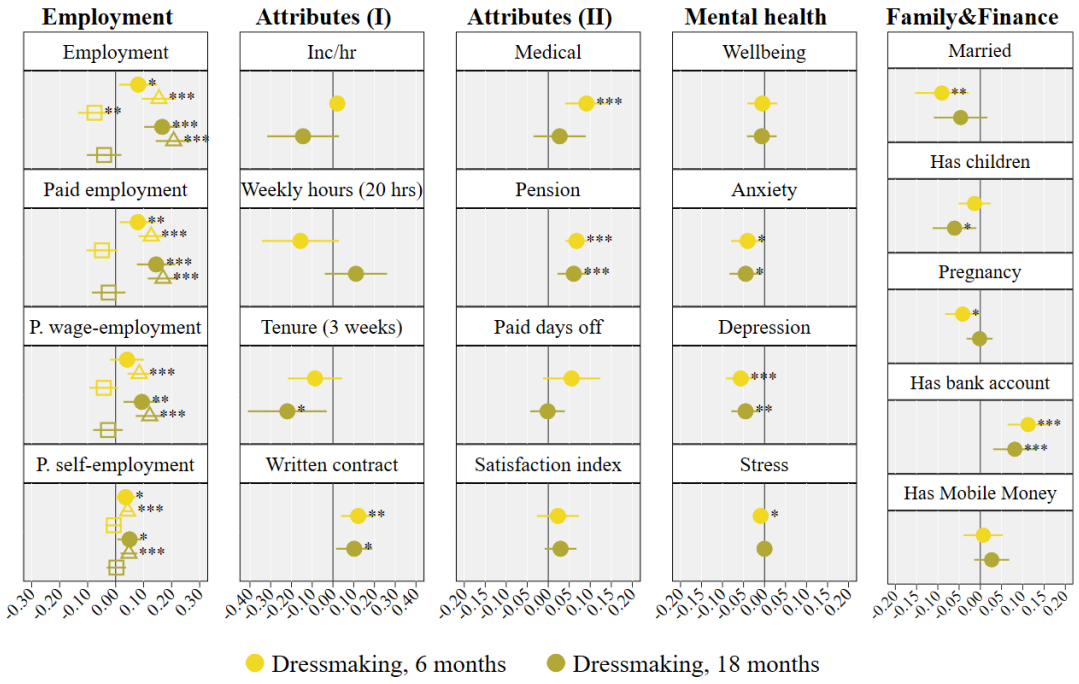

FIGURE 3. Mid-term effects in Dressmaking sample.
Notes: The figure show the results of OLS regressions for the sub-sample of individuals who registered for Dressmaking in the six-months (yellow) and the eighteen-months follow-up (green).

effect seems reasonable, given that finding wage-employment might take longer, especially when just entering the labor market without prior work experience and for occupations where wage employment is rather rare, than setting up a small and often informal business.[20]

Effects on written contract, pension, mental health, and finance persist at a similar magnitude and significance level. Though, we do no longer observe a difference in terms of medical benefits. The coefficient on tenure increases in size and becomes significant at low levels suggesting that the N4G training led to a delayed entry into employment by approximately 3 months. The negative effect on marriage observed six months after program completion is no longer significant, confirming that the N4G program only delayed marriage, but now reflects in a reduced probability to have children.

5.6. Drivers of the effects

Skills training programs, especially those with several components, can affect participants through different transmission channels. As for N4G, five main channels would be plausible: N4G-specific job placements, skills acquisition, establishment of business networks, changed job search behavior, and signaling through certification.

First, the N4G program required training providers to offer at least 70% of their trainees a job placement, either in providers' own businesses or with other employers. Even though the placement was not enforced it seems that a substantial share of the effects of N4G program are driven by these placements. Only 21.6% of the women who started the N4G program received a placement offer and only 20.4% accepted the offer (Appendix Figure A.I.5). This share slightly increases when reducing the sample to N4G participants who are employed at the time of the six-months follow-up. The share substantially increases when reducing the sample to N4G participants working in the trained occupation. More than one third of the women who participated in N4G and who are employed in the occupation in which they received the N4G training indicated that they accepted the N4G

20. In 2023, less than 12% of those working in Dressmaking, Beauty Therapy, or Hairdressing were employed as paid employees (GSS 2023).

job placement. While these results are only descriptive, they provide suggestive evidence of the importance of the N4G job placement component for the observed sectoral shift of employment into the occupation for which participants registered to receive the training in.

Second, N4G aimed at teaching participants the manual skills related to the sector they registered for. The curriculum also included soft and entrepreneurial skills training. To affect employment probability, the training should ensure that participants are equipped to that match the demand of employers or be able to start their own businesses. In the follow-ups, we asked study participants to rate their manual skills in fashion-industry-related areas and soft skills. Appendix Table A.V.1 shows that N4G significantly increased self-reported occupation-related manual skills in Dressmaking and Beauty Therapy but not in Hairdressing. On a scale from 0 to 1, treated participants rank their skills in Dressmaking 0.06 points (Beauty Therapy 0.04 points) higher than control participants, an increase by 15.5% (13.3%) compared to the control mean. The increase is more pronounced if running occupation-specific regressions but remains insignificant for Hairdressing. Treated participants further report skill levels for customer relations, time management, and accounting that are between 0.03 to 0.05 points (3.4 to 7.2%) higher than those of control participants. Though, occupation-specific regressions reveal that this effect is entirely driven by the Dressmaking sample.

Third, the training might have enabled participants to build up their own business network. Training classes took place in parallel to the ongoing business allowing participants to connect with potential future employers but also with their peers who are all interested in the same occupation. We measure business network by the number of persons study participants indicated to know personally whom they could contact within one day (i) to ask as an employer and (ii) to ask as an employee. Estimation results of Appendix Table A.V.2 show that N4G indeed significantly increased the number of persons participants indicate to be able to contact either as potential employer (25.1% compared to control mean) or as employee (9.3%).

Effects might also be driven by changes in participants' job search activities. At baseline and the six-months follow-up, we asked study participants about the number of channels they use to find paid work, how confident they feel when applying for jobs, as well as the number of job applications, job interviews, job offers, and employers during the past twelve months. Appendix Table A.V.3 reveals that if anything, the N4G program reduced the number of job applications. No significant differences exist between treated and control subjects in terms of job search channels, confidence, or the number of job interviews, job offers or employers during the past twelve months. In the eighteen-months follow-up we also asked participants about their employment aspirations as well as employment and income expectations.[21] N4G had no effect on aspirations nor income expectations but increased treated participants' expectations to be self-employed in five years.

Lastly, training programs usually go along with certification which can have important signaling effects to employers if training providers are established and well-known players in their occupation. All N4G providers were business owners running their businesses for several years. Nevertheless, for all short-term results this channel can be excluded. At the time of the six-months follow-up, none of the N4G participants had received their certificates. Also, the certificates later issued by GIZ did not include any of the training providers' names but only the names of the sponsors of N4G, which most likely do not signal manual excellence to future employers.

One fundamental requirement for skills training programs to improve participants' employment and living conditions is that the trained skills are in demand. In 2018, SEHP, one of the N4G program stakeholders, commissioned a market study to identify the needs of the Ghanaian fashion industry and to design the N4G program accordingly. However, the study only concentrated on the needs of fashion houses who identified the demand for better-skilled labor within Dressmaking. Whether a similar skill mismatch exists within Beauty Therapy and Hairdressing was not assessed. Consequently, the muted to non-existent effects of the N4G training in Beauty Therapy and

21. The question for aspirations was "Ideally, which of the following types of employment would you wish to have in the future, i.e., in 5 years?". The questions for expectations were "How likely do you think it is for you to have the following employment status in 5 years?" and "How much do you expect to earn per month in 5 years?".

Hairdressing might partially be driven by less market demand for these skills than for Dressmaking skills.

5.7. Costs and benefits of the training

The total costs of operation of the N4G program were EUR 1,223,000. They were covered by EUR 621,000 public and EUR 648,000 private investments. Given that at baseline most study participants were unemployed, the minimal reduction in tenure of only 3 months, and transportation costs being covered by the stipends, we expect the opportunity costs of the N4G training to be negligible and exclude them from the calculation. Assuming that despite the varying duration the training in the different occupations had comparable costs, this equals costs of EUR 1,631 for each of the 750 training slots. At baseline, employed study participants reported an average monthly income of USD 38.85, i.e., 28.6% of the training costs per person.

In Dressmaking, treated subjects are 35.0% more likely to be in paid employment and report monthly incomes that are USD 6.01 higher than those of untreated subjects eighteen-months after training conclusion. Assuming that the income effect has no seasonal variations, the costs EUR 1,631 per training slot compare to an annual income gain of approximately USD 72.17. However, these gains do not factor in the non-wage benefits obtained from better employment quality and improved quality-of-life. Evidence on preferences for job attributes is extremely scarce for developing countries. An exception is Mahmud et al. (2020) who apply discrete choice experiments to estimate the willingness to pay (WTP) for selected job attributes among workers in Bangladesh.[22] On average, workers in Bangladesh are willing to forego a 26.9% of their monthly income for a 1-year written contract, 5.3% to receive 10 days of paid days off, and 17.8% to have access to a pension plan. Applying these figures to the eighteen-months follow-up effects of the N4G training in Dressmaking they expand the gains by (i) USD 3.67 for written contract and (ii) USD 14.55 for access to a pension scheme.[23] This adds up to an annual gain of the N4G program of USD 218.64.

6. How do results compare to prior expectations?

The ultimate goal of impact evaluations is to inform policy and improve ongoing and future program designs. We next assess, first, how the results of the impact evaluation compare to stakeholders' expectations of the N4G training program and, second, whether the presentation of the evaluation results led to an updating of stakeholders' expectations for future training programs.

For this purpose, we interviewed GIZ employees in charge of the N4G program (N=4) and N4G training providers (N=17) as relevant stakeholders at two points in time. The first survey was implemented after the N4G program ended but before we shared any of the evaluation results. The second survey was conducted after the research team presented the evaluation results to the stakeholders using non-academic language and easy-to-understand graphs in an approximately one-hour dissemination event. Both surveys asked stakeholders about their expected performance of the N4G study sample regarding the probability to be self-employed, monthly income in the main job, and weekly working hours in the main job at the present time, which was shortly after our six-months follow-up. For each indicator, we asked for the average expected performance among (i) study participants who registered for N4G but were not invited, (ii) study participants who participated in the N4G training, (iii) the bottom quartile of study participants who participated in N4G and benefited the least, and (iv) the top quartile of study participants who participated in N4G and benefited the most. Questions about the N4G participants were anchored with the study sample's control mean in the six-months follow-up. We tried to avoid having stakeholders feel like

22. Franco and Rodríguez-Valencia (2023) assess WTP for health insurance among workers in Colombia, but the effects of N4G on medical benefits can only be observed in the six months follow-up.

23. The underlying calculations are (i) $(0.269 * 38.85USD) * (0.103/0.291) = 3.67USD$ for income and (ii) $(0.178 * 38.85USD) * (0.061/0.029) = 14.55USD$ for pension.

they were being tested by framing the second survey as an assessment of expectations for future N4G rounds if they were to be implemented exactly like the one under evaluation.

We calculate stakeholders' expectations of treatment effects from the difference between the survey-provided anchor value for the control group and stakeholders' guesses of outcomes experienced by program participants. We do this with respect to the average participant, the bottom quartile of participants, and the top quartile, and fit a distribution over each stakeholder's individual expectations. We then aggregate individual distributions to get an average prior distribution on the N4G program's treatment effect for each of three core indicators.[24]

Appendix Figure A.VIII.1 displays the individual prior distributions of stakeholders for the different indicators in light gray and the aggregate prior distribution in dark gray. While some stakeholders are uncertain about the impact of the N4G program (characterized by relatively flat and wide distributions) others are very confident and expect a very homogeneous effect across participants (characterized by very narrow distributions). On average, stakeholders expect a 40% reduction of the probability to be self-employed, an increase in monthly income by almost 200%, i.e., a threefold increase, and an increase in working hours by 14 hours per week. Each of the expected effects is far away from what our evaluation results showed.

To better understand where stakeholders' substantial overestimation of the N4G program's effects comes from, Appendix Figure A.VIII.2 compares the average performance levels of treatment and control participants observed in the data with the average performance levels expected by GIZ and training providers. Two misjudgments cause overestimation. First, stakeholders overestimate the performance level of study participants. Second, they overestimate the differences in performance levels between treatment and control group. Misjudgements is especially pronounced for the share of self-employment and monthly income, whereas expectations about working hours are more accurate.

Next, we calculate how stakeholders would update their priors given the data, i.e., the evaluation results, if they followed Bayes' rule. For this we use our IV results of having started the N4G training, with their normal sampling distribution, to define a likelihood. The prior distribution for the treatment parameter derives from the aggregate priors obtained through the elicitation survey among stakeholders.[25] We then calculate the aggregate posterior distribution functions as essentially an inverse-variance weighted average of the prior and the likelihood. Figure 4 shows the prior distribution in gray, the likelihood in the experimental data in blue, and the Bayesian posterior in green. Given the relatively precisely estimated effects in the data for self-employment and income and the relatively large uncertainty in the average stakeholders' prior, Bayesian inference predicts a strong updating of expected treatment effects for all outcomes towards zero.

In the last step, we compare the Bayesian posteriors to stakeholders' actual posteriors obtained through the second elicitation survey. Figure 4 displays the true posterior distribution of stakeholders in pink. For self-employment, stakeholders shifted their expectations towards even more positive expectations of program effects and now expect an increase in the share of self-employment of almost 50%. A minor shift towards more positive expectations can also be observed for income. Stakeholders might have focused on the positive – although to a much smaller extent – evaluation results for Dressmaking ignoring the muted effects for Beauty Therapy and Hairdressing. For working hours, stakeholders adjust their expected treatment effects downwards, but not to the same extent that Bayes' theorem would predict.

These results add several important insights to the still very limited literature that tries to assess to what extent the results of rigorous impact evaluations actually change policymakers' and practitioners' beliefs. First, we show that policymakers' updating process differs from Bayesian updating which is in line with findings from Vivalt and Coville (2023), although note the contrast to the findings by Hjort et al. (2021) among Brazilian mayors who received results of an impact evaluation. Second, we add evidence that "asymmetric optimism" could be one reason for why

24. For monthly income, we logarithmize the answers to account for the skewed nature of income and to help with interpretation.

25. For the purposes of our Bayesian estimation, we use a weakly informative normal prior for the constant, centered around the baseline average and with baseline variance. We use diffuse normal distributions with a large scale of variation for the occupation-region fixed effects.

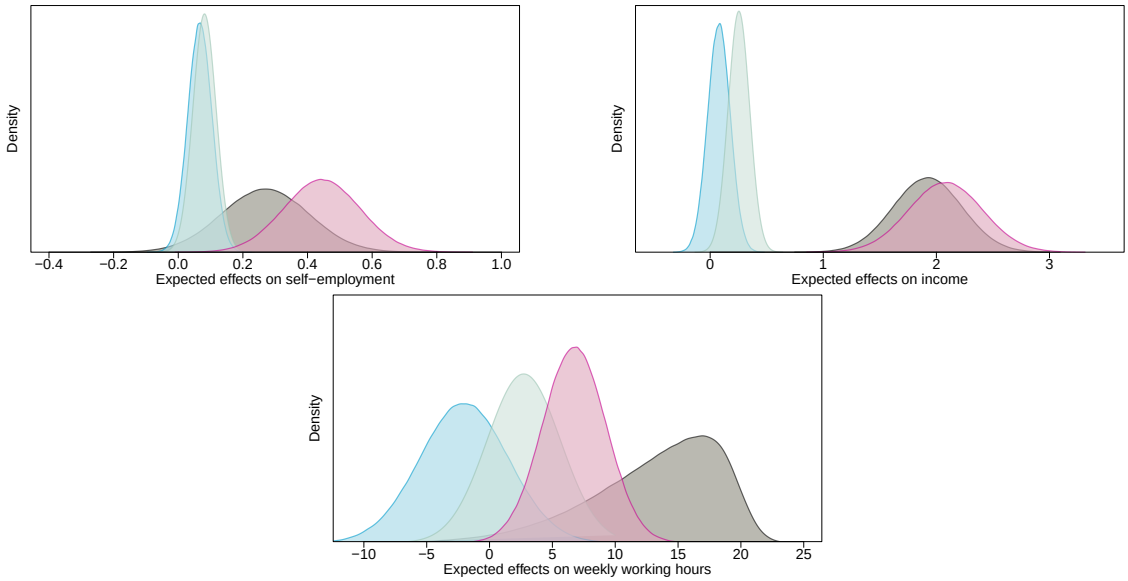

FIGURE 4. Bayesian updating.
Notes: The figure compares the distributions of stakeholders' prior expectations (gray), the likelihood in the data (blue), the calculated Bayesian posterior (green), and stakeholders' actual posterior (pink). The upper left graph shows the distributions for the probability to be self-employed, the upper right graph for monthly income (logarithmized), and the lower middle graph for weekly working hours.

Bayesian inference only imperfectly predicts belief updating.[26] Stakeholders seem to be more willing to update when being presented with "good news" like a reduction in working hours among employed rather than "bad news" like a null effect on slef-employment and income. This adds to findings of other studies showing asymmetric belief updating among policymakers (Vivalt and Coville 2023) and in other settings like migration or educational decisions (e.g., Frohnweiler et al. 2024; Möbius et al. 2022; Wiswall and Zafar 2015). And third, it is not clear that tailoring evaluation results as closely as possible to stakeholders' local contexts actually maximizes the chance that evaluation results will be taken into account (Vivalt et al. 2024). We do not see strong evidence that stakeholders update based on impact evaluation results of their own programs, and that they do so to a greater extent than they would in the fact of results from other programs in similar contexts or implemented by other agencies.

7. Conclusion

We presented evidence from an RCT on the short- and mid-term employment and livelihood effects of a best-practice youth skill training program implemented in Ghana between 2021 to 2022. The N4G program offered a free, practical- and industry-oriented, structured, and compact vocational skills training in the areas Dressmaking, Beauty Therapy, and Hairdressing to young women who are at the stage of transitioning into the labor market. Participants received training in manual, soft, and entrepreneurial skills, and upon completion, training providers were required to place at least 70% of the trainees.

We document that overall the N4G program showed no significant improvements in core labor market outcomes like employment, income, or working hours. But, occupation-specific subgroup analyses reveal that the N4G training in Dressmaking raised occupation-specific skills, expanded professional networks, and increased employment rates by 15.9% relative to the control mean after six months and by 27.9% after eighteen months. The effect size on employment lies in the upper range of comparable experimental impact evaluations of skills training programs as shown in a

26. Additional studies find that confirmation bias is another bias affecting policymakers' and practitioners' ability to make judgements based on empirical evidence (e.g., Banuri et al. 2019).

recent systematic review by Agarwal and Mani (2024). Further, N4G did have sizeable effects on occupations, employment quality, and quality-of-life. Treated participants are more than twice as likely to work in the trained occupation and under better conditions than participants of the control group. Treated women are 80.6% more likely to have access to medical benefits and 31.2% more likely to have a written contract, the latter going along with an by 34.9% increased probability to own a bank account. While the effects related to formal employment are somewhat lower than the increases between 40 and 50% observed by Attanasio et al. (2011) and Bandiera et al. (2023), they are large given the overall low formality in the occupations of Dressmaking, Beauty Therapy, and Hairdressing. According to the 2023 AHIES of Ghana, around 40% of the persons employed in these occupations report not having any type of contract or oral agreement compared to 20% in other occupations.

Our comprehensive data on non-employment outcomes further show that these improvements in employment quality are combined with reduced levels of anxiety and stress. We further observe a temporary delay in marriage six months after training completion followed by a reduced probability to have children eighteen months after training completion. Though, the positive effects observed in the total sample are driven by the N4G training in Dressmaking. Effects for Beauty Therapy and Hairdressing are muted or non-existent.

We explain the effect heterogeneity with differences in (i) the program design, (ii) provider characteristics, and (iii) local labor market structures. The training in Dressmaking had a longer duration and was offered by larger and formalized establishments with experience in curriculum-based training. Instead, the training in Beauty Therapy or Hairdressing were shorter and offered by micro-enterprises who previously mostly engaged in traditional apprenticeships of more unstructured and less formalized nature. A potential explanation for the heterogeneity observed across Dressmaking providers might be varying degrees of commitment to the N4G program. Moreover, solo-self-employment is the predominant type of employment in Beauty Therapy and Hairdressing whereas paid employment is somewhat more common in Dressmaking (GSS 2015, 2023). Conversations with training providers and participants as well as findings from other studies (e.g., Blattman and Ralston 2015; Hardy and McCasland 2023) suggest that the training in Beauty Therapy and Hairdressing might have benefited from additional capital injections, either for participants themselves to start their own business or for the training providers allowing them to enlarge their existing businesses.

The associated elicitation survey among stakeholders shows that policymakers and policy implementers hold overly optimistic beliefs about the program's impact on employment outcomes. After seeing the evaluation results, stakeholders only very selectively update their prior assessment of the program effects and overall continue to be overly optimistic.

These findings have direct implications for the design of ongoing and future training programs and the communication of impact evaluation results. Program effectiveness hinges on program design, targeted goals, and expectations being aligned to local conditions. This in turn requires context-specific knowledge. However, our elicitation survey reveals that stakeholder have this knowledge only to a limited extent, and are slow to update when they are given information that cuts against their prior expectations. This does not bode well for dynamic decision-making in development cooperation, for example in the context of adaptive programming, and perhaps it could be an explanation for why some suboptimal labor market interventions persist.

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Effects of skills training on employment and livelihood outcomes: A randomized controlled trial with young women in Ghana

Online Appendix

Appendix I. Training take-up and implementation

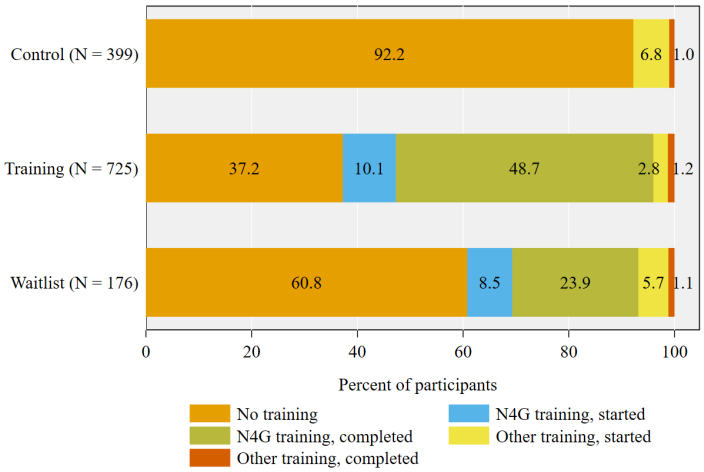


FIGURE A.I.1. Vocational training participation.
Notes: The figure shows which share of the study participants did not start any vocational training, started the N4G training, completed the N4G training, started another training, and completed another training across the randomly assigned treatment status grouped over all occupations and regions. The shares are assessed separately for participants of the control group, treated participants who were immediately invited to the N4G training, and treated participants who were initially assigned to the waitlist but later also invited to the N4G training.

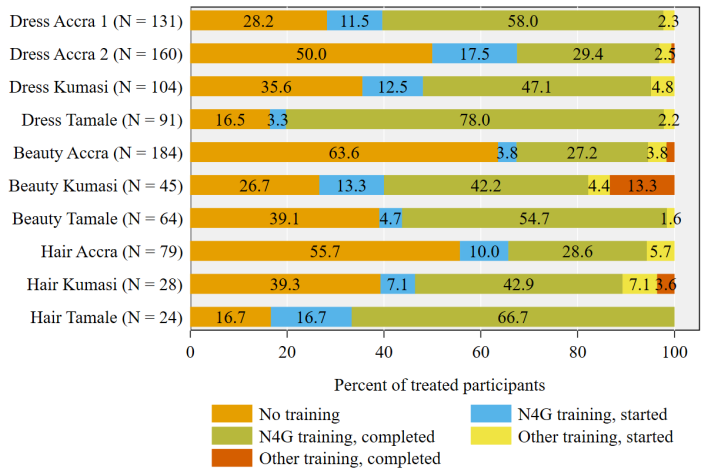
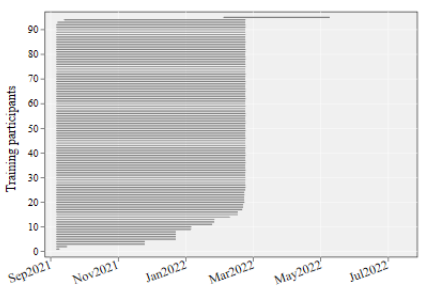


FIGURE A.I.2. Training participation among treated by provider.
Notes: The figure shows which share of the study participants assigned to treatment did not start any vocational training, started the N4G training, and started or completed another training across the ten different region and occupation combinations.

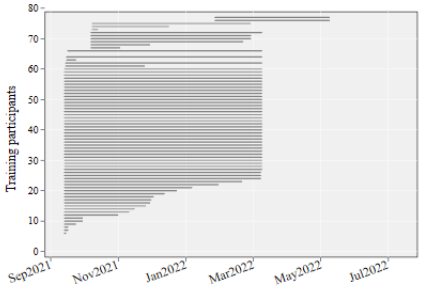
TABLE A.I.1. Effect of treatment assignment on treatment take-up by occupation.

	N4G training attendance				
	Self-reported			Attendance sheets	
	Started	Completed	Training days	Started	Training days
	(1)	(2)	(3)	(4)	(5)
Panel A: Total sample					
N4G treatment (assigned)	0.573	0.478	39.002	0.551	28.418
	(0.017)	(0.017)	(1.666)	(0.018)	(1.166)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1,300	1,300	1,289	1,332	1,332
Control mean	0.000	0.000	0.000	0.002	0.019
Occupation x Region FE	✓	✓	✓	✓	✓
Panel B: Dressmaking sample					
N4G treatment (assigned)	0.654	0.543	48.394	0.714	42.424
	(0.022)	(0.023)	(2.147)	(0.021)	(1.637)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	703	703	695	735	735
Control mean	0.000	0.000	0.000	0.000	0.000
Region FE	✓	✓	✓	✓	✓
Panel C: Beauty Therapy and Hairdressing sample					
N4G treatment (assigned)	0.480	0.405	28.372	0.354	11.504
	(0.025)	(0.025)	(2.460)	(0.026)	(1.103)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	597	597	594	597	597
Control mean	0.000	0.000	0.000	0.005	0.044
Region FE	✓	✓	✓	✓	✓

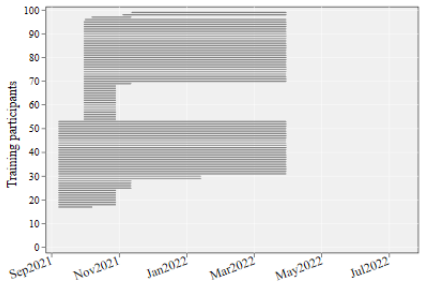
Note: Results from OLS estimations assessing the effects of randomly assigned N4G treatment status on the probability to start the N4G training (columns 1 and 4), the probability to complete the N4G training (column 3), and the attended training hours (columns 3 and 5). Columns 1 to 3 are based on self-reported responses from study participants collected at the 6-months follow-up. Columns 4 and 5 are based on the administrative data. Regressions in Panel A includes all study participants, Panel B includes study participants who registered for dressmaking, and Panel C includes study participants who registered for Beauty Therapy or Hairdressing. Estimations in Panel A include occupation-region fixed effects, estimations in Panel B and C include region FE. Robust standard errors are displayed in parentheses and p-values in squared brackets.



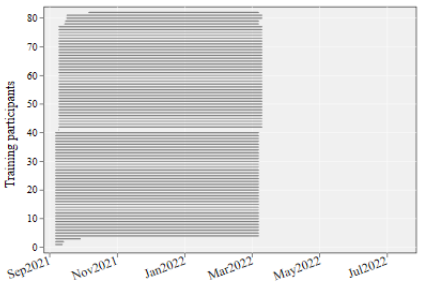
(A) Dressmaking - Accra 1



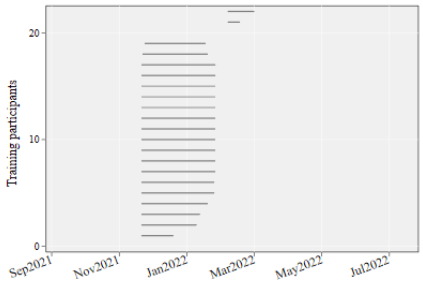
(B) Dressmaking - Accra 2



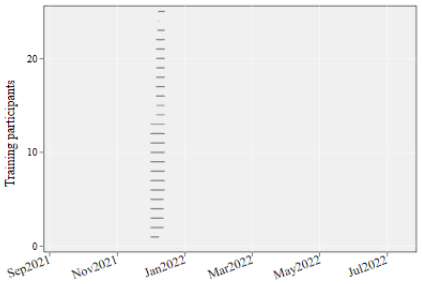
(C) Dressmaking - Kumasi



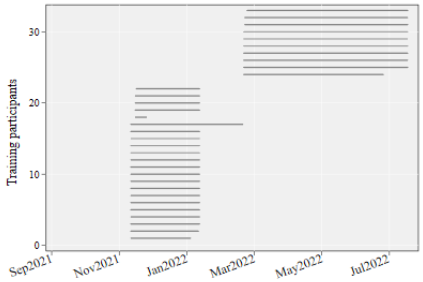
(D) Dressmaking - Tamale



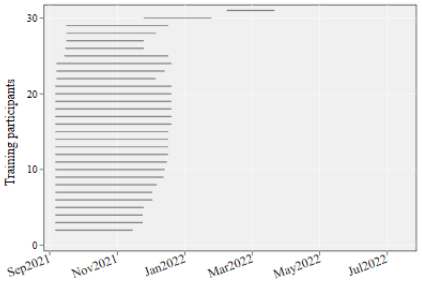
(E) Beauty Therapy - Accra



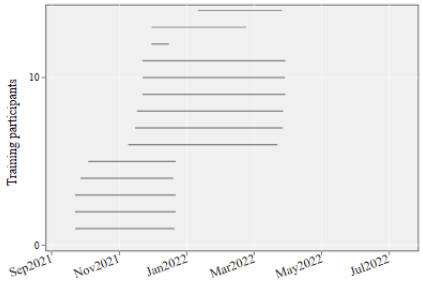
(F) Beauty Therapy - Kumasi



(G) Beauty Therapy - Tamale



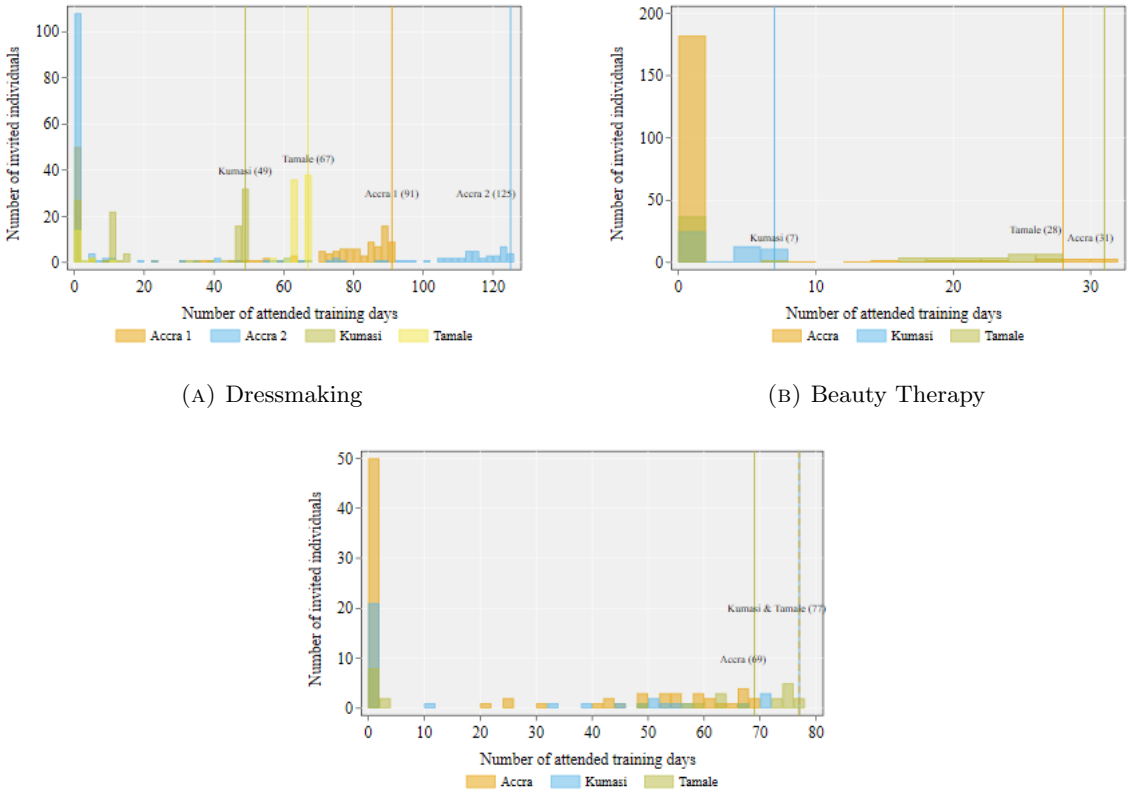
(H) Hairdressing - Accra



(I) Hairdressing - Kumasi

(J) Hairdressing - Tamale

FIGURE A.I.3. Time between first and last training day.
Notes: The figures show the time span between the first and last training days as reported in the attendance sheets. Each line represents the start and end date of one participant. Information is based on the attendance sheets provided by GIZ.



(A) Dressmaking

(B) Beauty Therapy

(C) Hairdressing

FIGURE A.I.4. Distribution of total number of attended training days.
Notes: The histograms show the distribution of the total number of attended training days of individuals who were invited to the N4G training for each training provider. Information is based on the attendance sheets provided by GIZ.

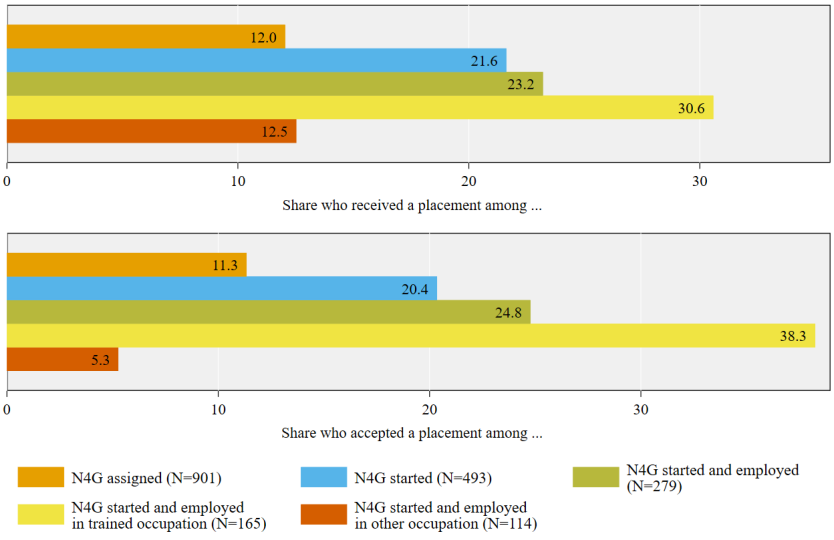


FIGURE A.I.5. Job placements of N4G training providers.
Notes: The graphs show the share of study participants who received a placement through the N4G training provider (upper graph) and the share who accepted the placement (lower graph) for different sub-samples. Each horizontal bar refers to a different sub-sample which are described in the legend together with their size.

Appendix II. Variables of the analysis

TABLE A.II.1. Variable names, definitions, and sources.

Variable	Definition	Source
	Explanatory variables	
N4G treatment (assigned)	Randomization among eligible baseline participants [0,1].	Treatment assignment
Started N4G program	Self-reported start of the N4G program [0,1].	6 months
Completed N4G program	Self-reported completion of the N4G program [0,1].	6 months
N4G training days	Training intensity calculated based on the self-reported number of weeks and days per weeks attended of the N4G training.	6 months
	Outcome variables	
Any employment	Self-reported employment of any form [0,1].	Baseline, 6 months, 18 months
Paid employment	Self-reported paid employment of any form [0,1].	Baseline, 6 months, 18 months
Wage-employment	Self-reported wage-employment with positive income [0,1].	Baseline, 6 months, 18 months
Self-employment	Self-reported self-employment with positive income [0,1].	Baseline, 6 months, 18 months
Unpaid employment	Self-reported unpaid employment of any form [0,1].	Baseline, 6 months, 18 months
Tenure	Time span in months between self-reported employment start date and interview date. If participant only remembered the year, the month is set to January.	Baseline, 6 months, 18 months
Inc/hr	Self-reported monthly income (USD) by working hours in main job including observations with zero income.	Baseline, 6 months, 18 months
Inc>0/hr	Self-reported monthly income (USD) by working hours in main job restricted to observations with positive incomes.	Baseline, 6 months, 18 months
Hours	Self-reported weekly working hours in main job in any sector.	Baseline, 6 months, 18 months
Medical benefits	Self-reported access to medical benefits in main job [0,1].	6 months, 18 months
Pension	Self-reported access to any pension or retirement fund in main job [0,1].	6 months, 18 months
Paid days off	Self-reported access to paid days off in main job [0,1].	6 months, 18 months
Written contract	Self-reported contractual status in main job [0,1].	Baseline, 6 months, 18 months
Job satisfaction	Satisfaction with main job self-reported on a 4-point likert scale [0,1].	Baseline, 6 months, 18 months
Anxiety	Frequency of feeling anxious self-reported based on the Generalized Anxiety Disorder 2-item (GAD-2) [0,1].	Baseline, 6 months, 18 months
Depression	Frequency of feeling depressed self-reported based on the Patient Health Questionnaire-2 (PHQ-2) [0,1].	Baseline, 6 months, 18 months
Stress	Frequency of feeling stressed self-reported on a 4-point likert scale [0,1].	Baseline, 6 months, 18 months
Wellbeing	General wellbeing self-reported on a 4-point likert scale [0,1].	6 months, 18 months
Married	Participant reported to be in any form of relationship [0,1].	Baseline, 6 months, 18 months
Has children	Participant reported to have own children [0,1].	Baseline, 6 months, 18 months
Pregnancy	Participant reported to be currently pregnant [0,1].	Baseline, 6 months, 18 months
Living with partner	Participant reported to live together with partner [0,1].	Baseline, 6 months, 18 months
Financially independent	Participant reported to finance her expenses exclusively from own money [0,1].	Baseline, 6 months, 18 months
Has bank account	Participant reported to have a bank account [0,1].	Baseline, 6 months, 18 months
Has Mobile Money	Participant reported to have a Mobile Money account [0,1].	Baseline, 6 months, 18 months
Has SuSu	Participant reported to be part of a saving scheme [0,1].	Baseline, 6 months, 18 months
	Complementary variables	

Table continues on next page

TABLE A.II.1. Variable names, definitions, and sources (continued)

Variable	Definition	Source
Occupation x Region FE	Interaction of three binary variables for the region of registration (Accra, Kumasi, Tamale) and three binary variables for the sector to receive the N4G training in (Dressmaking, Beauty Therapy, Hairdressing).	Baseline
Education	Self-reported highest completed educational level.	Baseline
Age groups	Self-reported age grouped into 16-18, 19-20, and 21-24.	Baseline
Knows N4G participant(s)	Participant reported to know someone who participated in N4G [0,1].	6 months
	Mediators	
Manual and soft skills	Self reported skills in Dressmaking, Beauty Therapy, Hairdressing, Fashion Accessories, customer management, time management, and accounting.	6 months, 18 months
Job search activity	Index for the number of self-reported ways of searching for jobs [0,1].	Baseline, 6 months
N° of applications	Self-reported number of job applications during past 12 (baseline) or 6 months.	Baseline, 6 months
N° of interviews	Self-reported number of job interviews during past 12 (baseline) or 6 months.	Baseline, 6 months
N° of job offers	Self-reported number of job offers during past 12 (baseline) or 6 months.	Baseline, 6 months
N° of employers	Self-reported number of employers during past 12 (baseline) or 6 months.	Baseline, 6 months

Note: Table shows the name, definition, and data source of all variables used throughout the analysis.

Appendix III. Additional results on labor market outcomes and quality-of-life indicators

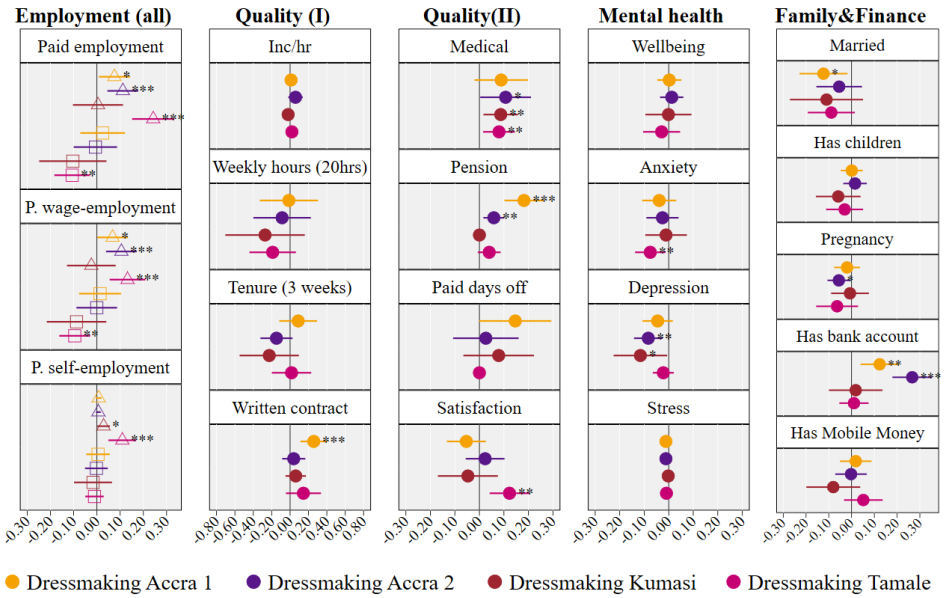


FIGURE A.III.1. Treatment effects by Dressmaking training provider.
Notes: Models include region fixed effects and the outcome measured at baseline if available. Robust standard errors used (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.1. Effect on employment probability and income – OLS and IV.

	Employment probability					Income	
	Any employment (1)	Paid employment (2)	Wage-employed (3)	Self-employed (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
Panel A: OLS							
N4G treatment (assigned)	0.038	0.035	0.003	0.032	0.003	1.333	0.602
	(0.030)	(0.029)	(0.026)	(0.018)	(0.022)	(1.745)	(1.670)
	[0.205]	[0.226]	[0.921]	[0.075]	[0.879]	[0.445]	[0.719]
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Panel B: IV for training start							
Started N4G program, self-reported	0.066	0.061	0.005	0.056	0.006	2.324	1.049
	(0.052)	(0.050)	(0.046)	(0.031)	(0.038)	(3.026)	(2.899)
	[0.202]	[0.224]	[0.921]	[0.072]	[0.879]	[0.442]	[0.717]
1^{st} stage F-stat.	1,141	1,140	1,127	1,134	1,139	1,129	1,127
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Panel C: IV for training completion							
Completed N4G program, self-reported	0.080	0.073	0.005	0.067	0.007	2.759	1.246
	(0.062)	(0.060)	(0.055)	(0.037)	(0.045)	(3.592)	(3.442)
	[0.201]	[0.223]	[0.921]	[0.072]	[0.879]	[0.442]	[0.717]
1^{st} stage F-stat.	780	780	772	775	779	783	782
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Panel D: IV for training days (in 5 days)							
N4G training days (self-reported)	0.005	0.004	0.000	0.004	0.000	0.147	0.053
	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.220)	(0.211)
	[0.218]	[0.240]	[0.891]	[0.095]	[0.879]	[0.505]	[0.803]
1^{st} stage F-stat.	549	549	544	548	547	543	542
Observations	1,289	1,289	1,289	1,289	1,289	1,265	1,265
Control mean, base	0.226	0.185	0.115	0.070	0.040	7.616	7.358
Control mean, 6m	0.491	0.341	0.253	0.088	0.150	13.198	12.549
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS and IV estimations assessing the effect of the N4G training on employment probability and income. Panel A displays results from OLS estimations and Panels B to D display results from IV estimations. IV estimations use the random treatment assignment as instrument for self-reported training start, training completion, and training days in units of 5 days. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.2. Effect on employment probability and income by occupation.

	Employment probability					Income	
	Total employment	Paid employment	Wage-employed	Self-employed	Unpaid employment	Income, total	Income, main
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Dressmaking sample							
N4G treatment (assigned)	0.080	0.079	0.041	0.035	0.002	3.721	2.989
	(0.041)	(0.039)	(0.037)	(0.021)	(0.034)	(2.081)	(2.056)
	[0.053]	[0.044]	[0.268]	[0.098]	[0.961]	[0.074]	[0.146]
Observations	703	703	703	703	703	687	687
Control mean, base	0.212	0.161	0.097	0.065	0.051	6.692	6.692
Control mean, 6 months	0.502	0.300	0.244	0.055	0.203	10.688	10.617
Panel B: Beauty Therapy and Hairdressing sample							
N4G treatment (assigned)	-0.003	-0.008	-0.035	0.028	0.005	-1.150	-1.871
	(0.043)	(0.042)	(0.037)	(0.029)	(0.026)	(2.835)	(2.656)
	[0.944]	[0.852]	[0.345]	[0.338]	[0.839]	[0.685]	[0.482]
Observations	597	597	597	597	597	589	589
Control mean, base	0.242	0.214	0.137	0.077	0.027	8.719	8.152
Control mean, 6 months	0.478	0.390	0.264	0.126	0.088	16.196	14.858
Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on employment probability and income. Panel A estimates the effect for the sample who registered for Dressmaking. Panel B estimates the effect for the sample who registered for Beauty Therapy or Hairdressing. Models include region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.3. Effect on job attributes among employed by occupation.

	Inc/hr	Inc>0/hr	Hours	Tenure (months)	Written contract	Medical benefits	Pension	Paid days off	Job satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Dressmaking sample									
N4G treatment (assigned)	0.021	0.022	-3.131	-1.813	0.122	0.091	0.067	0.056	0.023
	(0.022)	(0.029)	(2.254)	(1.657)	(0.050)	(0.031)	(0.016)	(0.041)	(0.030)
	[0.332]	[0.443]	[0.166]	[0.274]	[0.015]	[0.003]	[0.000]	[0.180]	[0.444]
Observations	391	248	391	368	339	344	344	344	391
Control mean, base	0.143	0.214	11.706	5.010	0.010	-	-	-	0.311
Control mean, 6 months	0.121	0.203	52.991	13.697	0.208	0.041	0.000	0.124	0.357
Panel B: Beauty Therapy and Hairdressing sample									
N4G treatment (assigned)	0.040	0.068	2.157	0.862	0.008	-0.005	-0.024	0.013	0.093
	(0.073)	(0.090)	(3.038)	(2.008)	(0.064)	(0.048)	(0.050)	(0.060)	(0.035)
	[0.586]	[0.450]	[0.478]	[0.668]	[0.900]	[0.921]	[0.624]	[0.829]	[0.009]
Observations	283	223	283	270	197	199	199	199	283
Control mean, base	0.251	0.300	16.230	6.447	0.047	-	-	-	0.336
Control mean, 6 months	0.257	0.314	47.437	14.071	0.281	0.106	0.121	0.197	0.330
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on job attributes among study participants that are employed at the time of the 6 months follow-up. Panel A estimates the effect for the sample who registered for Dressmaking. Panel B estimates the effect for the sample who registered for Beauty Therapy or Hairdressing. Models include region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.4. Effect on quality-of-life indicators by occupation.

	Mental health				Family				Finances			
	Wellbeing	Anxiety	Depression	Stress	Marriage	Has Children	Pregnancy	Living w/ partner	Financial indep.	Bank account	Mobile money	SuSu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Dressmaking sample												
N4G treatment (assigned)	-0.005	-0.040	-0.057	-0.009	-0.090	-0.014	-0.042	-0.055	0.012	0.112	0.007	0.022
	(0.022)	(0.024)	(0.021)	(0.005)	(0.038)	(0.023)	(0.025)	(0.031)	(0.035)	(0.029)	(0.028)	(0.033)
	[0.811]	[0.095]	[0.008]	[0.067]	[0.018]	[0.555]	[0.094]	[0.076]	[0.726]	[0.000]	[0.809]	[0.492]
Observations	703	635	635	635	702	703	703	692	703	703	703	703
Control mean, base	-	0.280	0.255	0.052	0.394	0.217	0.000	0.133	0.088	0.069	0.664	0.111
Control mean, 6 months	0.521	0.357	0.291	0.064	0.606	0.281	0.124	0.289	0.235	0.143	0.793	0.198
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Panel B: Beauty Therapy and Hairdressing sample												
N4G treatment (assigned)	-0.010	-0.030	0.006	-0.009	-0.062	-0.002	0.016	0.023	-0.036	0.019	0.002	-0.025
	(0.022)	(0.025)	(0.024)	(0.005)	(0.043)	(0.023)	(0.017)	(0.026)	(0.038)	(0.034)	(0.026)	(0.039)
	[0.656]	[0.242]	[0.792]	[0.074]	[0.149]	[0.917]	[0.335]	[0.377]	[0.342]	[0.582]	[0.925]	[0.521]
Observations	597	560	560	560	597	597	597	589	597	597	597	597
Control mean, base	-	0.255	0.256	0.046	0.445	0.203	0.000	0.089	0.110	0.126	0.775	0.170
Control mean, 6 months	0.529	0.347	0.279	0.063	0.527	0.253	0.033	0.123	0.291	0.258	0.874	0.324
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on quality-of-life indicators. Panel A estimates the effect for the sample who registered for Dressmaking. Panel B estimates the effect for the sample who registered for Beauty Therapy or Hairdressing. Models include region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.5. Effect heterogeneity on employment and income by participant characteristics.

	Employment probability					Income	
	Total employment (1)	Paid employment (2)	Wage-employed (3)	Self-employed (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
Age groups							
N4G (assigned) X Age 16-18	-0.048	0.085	0.088	-0.003	-0.130	-6.199	-5.776
	(0.100)	(0.076)	(0.067)	(0.039)	(0.087)	(4.270)	(4.122)
N4G (assigned) X Age 18-20	0.042	0.032	0.024	0.008	0.008	0.839	-0.074
	(0.049)	(0.047)	(0.042)	(0.030)	(0.035)	(2.892)	(2.769)
N4G (assigned) X Age 21-24	0.044	0.015	-0.036	0.051**	0.030	2.344	1.577
	(0.041)	(0.039)	(0.037)	(0.024)	(0.027)	(2.284)	(2.206)
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Educational level							
N4G (assigned) X None	0.030	0.079	0.062	0.017	-0.053	-3.149	-3.061
	(0.116)	(0.108)	(0.089)	(0.072)	(0.078)	(5.489)	(5.495)
N4G (assigned) X Primary	0.065	0.045	-0.009	0.054	0.022	-1.378	-0.690
	(0.064)	(0.060)	(0.055)	(0.040)	(0.053)	(2.630)	(2.471)
N4G (assigned) X JHS	0.044	0.082	0.061	0.022	-0.039	3.820	2.540
	(0.055)	(0.051)	(0.045)	(0.031)	(0.043)	(3.119)	(3.074)
N4G (assigned) X SHS	0.025	-0.015	-0.048	0.033	0.040	1.035	-0.107
	(0.046)	(0.045)	(0.042)	(0.026)	(0.027)	(2.900)	(2.737)
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Marital status							
N4G (assigned) X Never married	0.014	0.010	-0.017	0.027	0.004	-0.941	-1.122
	(0.039)	(0.037)	(0.035)	(0.022)	(0.030)	(2.218)	(2.187)
N4G (assigned) X Ever married	0.076*	0.074*	0.034	0.039	0.001	4.502*	2.979
	(0.046)	(0.044)	(0.039)	(0.029)	(0.031)	(2.650)	(2.455)
Observations	1,299	1,299	1,299	1,299	1,299	1,275	1,275
Children							
N4G (assigned) X No children	0.041	0.032	0.013	0.019	0.008	0.852	0.518
	(0.034)	(0.032)	(0.029)	(0.020)	(0.024)	(1.983)	(1.926)
N4G (assigned) X Children	0.028	0.046	-0.038	0.083**	-0.017	3.232	0.922
	(0.065)	(0.063)	(0.058)	(0.036)	(0.047)	(3.259)	(2.912)
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Employment status							
N4G (assigned) X Uemployed	0.054	0.056*	0.021	0.035*	-0.002	0.991	-0.093
	(0.034)	(0.032)	(0.029)	(0.019)	(0.025)	(1.873)	(1.786)
N4G (assigned) X Employed	-0.016	-0.035	-0.060	0.019	0.021	2.571	3.138
	(0.061)	(0.063)	(0.061)	(0.043)	(0.041)	(4.092)	(3.954)
Observations	1,300	1,300	1,300	1,300	1,300	1,276	1,276
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on employment probability and income depending on individual-level baseline characteristics. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.6. Effect heterogeneity on job attributes by participant characteristics.

	Inc/hr	Inc>0/hr	Hours	Tenure (month)	Written contract	Medical benefits	Pension	Paid days off	Job Satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age groups									
N4G (assigned) X Age 16-17	-0.037	-0.147	-4.670	-4.222	-0.084	-0.006	-0.070	-0.134	-0.051
	(0.042)	(0.096)	(5.249)	(3.041)	(0.091)	(0.017)	(0.111)	(0.134)	(0.080)
N4G (assigned) X Age 18-20	0.035	0.065	-1.951	-1.707	0.067	0.005	0.107**	0.098	0.061
	(0.074)	(0.104)	(3.058)	(2.192)	(0.049)	(0.036)	(0.050)	(0.064)	(0.040)
N4G (assigned) X Age 21-24	0.033	0.048	0.454	1.307	0.058*	0.049	0.003	0.096*	0.070**
	(0.031)	(0.037)	(2.553)	(1.741)	(0.032)	(0.032)	(0.049)	(0.054)	(0.030)
Observations	674	471	674	638	543	543	543	536	674
Educational level									
N4G (assigned) X None	0.034	0.017	-4.019	5.665	-0.039	0.010	0.001	0.145	0.045
	(0.070)	(0.102)	(6.644)	(5.260)	(0.124)	(0.019)	(0.044)	(0.161)	(0.093)
N4G (assigned) X Primary	0.055	0.117	-6.177*	2.254	0.084	0.037	0.131**	-0.067	0.108**
	(0.046)	(0.075)	(3.648)	(3.047)	(0.053)	(0.024)	(0.062)	(0.086)	(0.047)
N4G (assigned) X JHS	0.030	0.001	1.556	-1.419	0.060	0.029	0.008	0.075	0.029
	(0.074)	(0.113)	(3.399)	(1.651)	(0.041)	(0.038)	(0.071)	(0.077)	(0.046)
N4G (assigned) X SHS	0.023	0.048	0.578	-1.596	0.048	0.024	0.008	0.130**	0.053
	(0.048)	(0.056)	(2.958)	(2.137)	(0.046)	(0.042)	(0.057)	(0.057)	(0.034)
Observations	674	471	674	638	543	543	543	536	674
Marital status									
N4G (assigned) X Never married	0.044	0.064	-1.889	-0.627	0.013	0.033	-0.014	0.109**	0.049*
	(0.044)	(0.062)	(2.381)	(1.350)	(0.036)	(0.027)	(0.046)	(0.050)	(0.029)
N4G (assigned) X Ever married	0.025	0.037	-0.024	0.235	0.117***	0.023	0.110**	0.014	0.063*
	(0.056)	(0.077)	(2.920)	(2.461)	(0.038)	(0.036)	(0.052)	(0.069)	(0.038)
Observations	673	470	673	637	542	542	542	535	673
Children									
N4G (assigned) X No Children	0.032	0.047	-1.454	-1.198	0.054*	0.015	0.034	0.059	0.036
	(0.041)	(0.056)	(2.076)	(1.464)	(0.030)	(0.024)	(0.039)	(0.045)	(0.026)
N4G (assigned) X Children	0.058	0.074	0.537	3.253	0.051	0.094*	0.044	0.139	0.130**
	(0.052)	(0.069)	(3.936)	(2.408)	(0.056)	(0.049)	(0.078)	(0.090)	(0.050)
Observations	674	471	674	638	543	543	543	536	674
Employment status									
N4G (assigned) X Unemployed	0.020	0.018	-3.017	-0.411	0.054*	0.025	0.051	0.064	0.065**
	(0.045)	(0.066)	(2.200)	(1.416)	(0.031)	(0.020)	(0.039)	(0.047)	(0.027)
N4G (assigned) X Employed	0.077*	0.105**	2.318	-0.249	0.055	0.051	-0.002	0.096	0.028
	(0.042)	(0.052)	(3.236)	(2.676)	(0.053)	(0.057)	(0.070)	(0.076)	(0.042)
Observations	674	471	674	638	543	543	543	536	674
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on job attributes depending on individual-level baseline characteristics. Regressions are run among participants that are employed at the time of the 6-months follow-up. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.7. Effect heterogeneity on mental health and living conditions by participant characteristics.

	Wellbeing and mental health				Family				Finances			
	Wellbeing (1)	Anxiety (2)	Depression (3)	Stress (4)	Marriage (5)	Has Children (6)	Pregnancy (7)	Living w/ partner (8)	Financial indep. (9)	Bank account (10)	Mobile money (11)	SuSu (12)
Age groups												
N4G (assigned) X Age 16-17	0.052	-0.035	-0.035	-0.011**	0.034	0.016	-0.044	0.059	0.055	0.035	-0.144	0.092
	(0.060)	(0.023)	(0.021)	(0.005)	(0.082)	(0.011)	(0.049)	(0.056)	(0.051)	(0.045)	(0.096)	(0.085)
N4G (assigned) X Age 18-20	-0.020	-0.029	-0.009	-0.005	-0.043	0.008	-0.012	0.006	0.013	0.046	0.004	0.036
	(0.025)	(0.027)	(0.024)	(0.005)	(0.046)	(0.027)	(0.023)	(0.031)	(0.041)	(0.037)	(0.032)	(0.039)
N4G (assigned) X Age 21-24	-0.010	-0.035	-0.035	-0.011**	-0.131***	-0.029	-0.009	-0.050*	-0.045	0.082***	0.018	-0.034
	(0.021)	(0.023)	(0.021)	(0.005)	(0.039)	(0.024)	(0.023)	(0.029)	(0.036)	(0.032)	(0.021)	(0.035)
Observations	1,300	1,195	1,195	1,195	1,299	1,300	1,300	1,281	1,300	1,300	1,300	1,300
Educational level												
N4G (assigned) X None	-0.046	-0.016	0.043	-0.004	-0.156*	0.043	-0.012	0.005	0.041	0.031	-0.073	0.058
	(0.069)	(0.065)	(0.054)	(0.013)	(0.094)	(0.074)	(0.082)	(0.103)	(0.072)	(0.050)	(0.097)	(0.080)
N4G (assigned) X Primary	-0.002	-0.028	-0.029	-0.005	-0.049	0.067	0.042	0.014	-0.089	0.015	0.042	-0.007
	(0.041)	(0.041)	(0.036)	(0.008)	(0.061)	(0.041)	(0.034)	(0.056)	(0.056)	(0.042)	(0.053)	(0.054)
N4G (assigned) X JHS	-0.029	-0.048	-0.033	-0.014**	-0.019	-0.018	-0.027	-0.009	0.074*	0.139***	-0.000	-0.023
	(0.026)	(0.034)	(0.031)	(0.007)	(0.051)	(0.027)	(0.027)	(0.033)	(0.043)	(0.036)	(0.038)	(0.048)
N4G (assigned) X SHS	0.015	-0.027	-0.032	-0.009*	-0.123***	-0.040*	-0.034	-0.041	-0.044	0.038	-0.009	0.008
	(0.021)	(0.025)	(0.023)	(0.005)	(0.044)	(0.024)	(0.024)	(0.026)	(0.042)	(0.039)	(0.018)	(0.039)
Observations	1,300	1,195	1,195	1,195	1,299	1,300	1,300	1,281	1,300	1,300	1,300	1,300
Marital status												
N4G (assigned) X Never married	-0.009	-0.033	-0.032	-0.012**	-0.080**	-0.005	-0.014	-0.043*	0.000	0.093***	0.004	0.002
	(0.020)	(0.023)	(0.022)	(0.005)	(0.038)	(0.019)	(0.018)	(0.025)	(0.032)	(0.028)	(0.026)	(0.032)
N4G (assigned) X Ever married	-0.004	-0.037	-0.021	-0.005	-0.081*	-0.015	-0.014	0.014	-0.029	0.031	0.009	-0.010
	(0.023)	(0.026)	(0.023)	(0.005)	(0.042)	(0.028)	(0.026)	(0.034)	(0.040)	(0.036)	(0.027)	(0.040)
Observations	1,299	1,194	1,194	1,194	1,299	1,299	1,299	1,281	1,299	1,299	1,299	1,299
Children												
N4G (assigned) X No children	-0.007	-0.024	-0.018	-0.008**	-0.068**	-0.013	-0.021	-0.013	0.002	0.053**	-0.014	0.006
	(0.017)	(0.020)	(0.018)	(0.004)	(0.032)	(0.019)	(0.017)	(0.021)	(0.028)	(0.025)	(0.021)	(0.028)
N4G (assigned) X Children	-0.010	-0.069*	-0.057*	-0.011	-0.127**	0.007	0.015	-0.047	-0.062	0.125***	0.081*	-0.031
	(0.036)	(0.035)	(0.033)	(0.008)	(0.056)	(0.032)	(0.038)	(0.057)	(0.058)	(0.047)	(0.044)	(0.059)
Observations	1,300	1,195	1,195	1,195	1,299	1,300	1,300	1,281	1,300	1,300	1,300	1,300
Employment status												
N4G (assigned) X Unemployed	-0.008	-0.036*	-0.016	-0.008**	-0.097***	-0.014	-0.001	-0.016	-0.020	0.066***	0.005	-0.030
	(0.018)	(0.019)	(0.017)	(0.004)	(0.032)	(0.019)	(0.016)	(0.023)	(0.027)	(0.024)	(0.022)	(0.028)
N4G (assigned) X Employed	-0.003	-0.027	-0.072*	-0.012	-0.011	0.012	-0.066	-0.032	0.033	0.079	0.011	0.116**
	(0.032)	(0.040)	(0.040)	(0.008)	(0.063)	(0.031)	(0.042)	(0.042)	(0.063)	(0.058)	(0.037)	(0.059)
Observations	1,300	1,195	1,195	1,195	1,299	1,300	1,300	1,281	1,300	1,300	1,300	1,300

Note: Results from OLS estimations assessing the effect of the N4G training on quality-of-life indicators. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

TABLE A.III.8. Short- and mid-term effect on employment probability and income in Dressmaking sample.

	Employment probability					Income	
	Total employment (1)	Paid employment (2)	Wage-employed (3)	Self-employed (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
Panel A: Economic activity in any occupation							
N4G treatment (assigned), 18 months	0.166	0.145	0.094	0.050	0.021	6.014	5.542
	(0.039)	(0.042)	(0.040)	(0.026)	(0.033)	(2.545)	(2.388)
	[0.000]	[0.001]	[0.019]	[0.061]	[0.537]	[0.018]	[0.021]
Observations	692	692	692	692	692	684	684
N4G treatment (assigned), 6 months	0.080	0.079	0.041	0.035	0.002	3.721	2.989
	(0.041)	(0.039)	(0.037)	(0.021)	(0.034)	(2.081)	(2.056)
	[0.053]	[0.044]	[0.268]	[0.098]	[0.961]	[0.074]	[0.146]
Observations	703	703	703	703	703	687	687
Control mean, base	0.200	0.150	0.095	0.055	0.050	6.292	6.292
Control mean, 6 months	0.502	0.300	0.244	0.055	0.203	10.688	10.617
Control mean, 18 months	0.595	0.414	0.295	0.118	0.182	14.217	12.982
Panel B: Economic activity inside registered occupation							
N4G treatment (assigned), 18 months	0.207	0.169	0.122	0.047	0.038	5.747	5.492
	(0.039)	(0.033)	(0.030)	(0.018)	(0.031)	(1.322)	(0.993)
	[0.000]	[0.000]	[0.000]	[0.009]	[0.222]	[0.000]	[0.000]
Observations	692	692	692	692	692	684	684
N4G treatment (assigned), 6 months	0.154	0.127	0.084	0.043	0.028	5.718	5.156
	(0.037)	(0.027)	(0.025)	(0.012)	(0.031)	(1.315)	(1.290)
	[0.000]	[0.000]	[0.001]	[0.000]	[0.376]	[0.000]	[0.000]
Observations	703	703	703	703	703	687	687
Control mean, base	0.014	0.005	0.005	0.000	0.009	0.002	0.002
Control mean, 6 months	0.230	0.074	0.069	0.005	0.157	1.645	1.624
Control mean, 18 months	0.300	0.150	0.118	0.032	0.150	3.096	2.000
Panel C: Economic activity outside registered occupation							
N4G treatment (assigned), 18 months	-0.041	-0.025	-0.027	0.003	-0.017	0.241	0.016
	(0.037)	(0.036)	(0.032)	(0.021)	(0.014)	(2.346)	(2.301)
	[0.270]	[0.494]	[0.392]	[0.891]	[0.242]	[0.918]	[0.994]
Observations	692	692	692	692	692	684	684
N4G treatment (assigned), 6 months	-0.075	-0.049	-0.043	-0.007	-0.026	-2.076	-2.215
	(0.036)	(0.034)	(0.031)	(0.018)	(0.016)	(1.726)	(1.706)
	[0.034]	[0.147]	[0.166]	[0.700]	[0.095]	[0.230]	[0.195]
Observations	703	703	703	703	703	687	687
Control mean, base	0.186	0.145	0.091	0.055	0.041	6.291	6.291
Control mean, 6 months	0.272	0.226	0.175	0.051	0.046	9.044	8.992
Control mean, 18 months	0.295	0.264	0.177	0.086	0.032	11.122	10.982
Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on employment probability and income. In Panel A, the outcomes do not take into account in which occupation the employment takes place. In Panel B, the outcomes only take employment in the registered occupation into account. In Panel C, the outcomes only take employment outside the registered occupation into account. Models include region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.9. Short and mid-term effect on job attributes among employed in Dressmaking sample.

	Inc/hr	Inc>0/hr	Hours	Tenure (month)	Written contract	Medical benefits	Pension	Paid days off	Job Satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N4G treatment (assigned), 18 months	-0.144	-0.225	2.216	-4.613	0.103	0.027	0.061	-0.001	0.029
	(0.105)	(0.153)	(1.816)	(2.420)	(0.053)	(0.038)	(0.023)	(0.025)	(0.023)
	[0.170]	[0.141]	[0.223]	[0.057]	[0.054]	[0.472]	[0.010]	[0.953]	[0.203]
Observations	481	344	481	470	388	390	390	390	481
N4G treatment (assigned), 6 months	0.021	0.022	-3.131	-1.813	0.122	0.091	0.067	0.056	0.023
	(0.022)	(0.029)	(2.254)	(1.657)	(0.050)	(0.031)	(0.016)	(0.041)	(0.030)
	[0.332]	[0.443]	[0.166]	[0.274]	[0.015]	[0.003]	[0.000]	[0.180]	[0.444]
Observations	391	248	391	368	339	344	344	344	391
Control mean, base	0.154	0.227	9.618	4.767	0.010	-	-	-	0.361
Control mean, 6 months	0.121	0.203	52.991	13.697	0.208	0.041	0.000	0.124	0.357
Control mean, 18 months	0.286	0.411	47.611	22.364	0.291	0.115	0.029	0.048	0.373
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on job attributes depending on individual-level baseline characteristics. Regressions are run among participants that are employed at the time of the 6-months follow-up and the 18 months follow-up respectively. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.III.10. Short- and mid-term effect on quality-of-life indicators in Dressmaking sample.

	Wellbeing and mental health				Family				Finances			
	Wellbeing (1)	Anxiety (2)	Depression (3)	Stress (4)	Marriage (5)	Has children (6)	Preg-nancy (7)	Living w/ partner (8)	Financial indep. (9)	Bank account (10)	Mobile money (11)	SuSu (12)
N4G treatment (assigned), 18 months	-0.006	-0.045	-0.045	0.000	-0.046	-0.061	-0.002	-0.040	0.027	0.081	0.027	0.090
	(0.021)	(0.023)	(0.021)	(0.005)	(0.038)	(0.031)	(0.019)	(0.033)	(0.034)	(0.031)	(0.025)	(0.036)
	[0.765]	[0.057]	[0.030]	[0.994]	[0.226]	[0.052]	[0.926]	[0.225]	[0.429]	[0.009]	[0.286]	[0.013]
Observations	692	627	627	627	691	692	691	680	692	692	692	692
N4G treatment (assigned), 6 months	-0.005	-0.040	-0.057	-0.009	-0.090	-0.014	-0.042	-0.055	0.012	0.112	0.007	0.022
	(0.022)	(0.024)	(0.021)	(0.005)	(0.038)	(0.023)	(0.025)	(0.031)	(0.035)	(0.029)	(0.028)	(0.033)
	[0.811]	[0.095]	[0.008]	[0.067]	[0.018]	[0.555]	[0.094]	[0.076]	[0.726]	[0.000]	[0.809]	[0.492]
Observations	703	635	635	635	702	703	703	692	703	703	703	703
Control mean, base	-	0.277	0.259	0.052	0.388	0.223	0.000	0.130	0.082	0.077	0.677	0.109
Control mean, 6 months	0.521	0.357	0.291	0.064	0.606	0.281	0.124	0.289	0.235	0.143	0.793	0.198
Control mean, 18 months	0.556	0.367	0.274	0.057	0.607	0.418	0.064	0.338	0.205	0.182	0.877	0.241
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on quality-of-life indicators. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

Appendix V. Mediators

TABLE A.V.1. Treatment effects on manual and softskills.

	Skills development						
	Dressmaking (1)	Hairdressing (2)	Beauty (3)	Accessories (4)	Customers (5)	Time management (6)	Accounting (7)
Panel A: ITT							
N4G treatment (assigned)	0.059	-0.015	0.037	0.026	0.028	0.030	0.049
	(0.018)	(0.018)	(0.018)	(0.019)	(0.014)	(0.013)	(0.017)
	[0.001]	[0.414]	[0.038]	[0.164]	[0.050]	[0.026]	[0.003]
Observations	1,300	1,300	1,300	1,300	1,300	1,300	1,299
Control mean	0.380	0.365	0.279	0.259	0.757	0.751	0.682
Panel B: IV for training start							
Started N4G program, self-reported	0.104	-0.026	0.064	0.046	0.050	0.052	0.085
	(0.031)	(0.031)	(0.031)	(0.033)	(0.025)	(0.023)	(0.029)
	[0.001]	[0.412]	[0.036]	[0.162]	[0.048]	[0.025]	[0.003]
1^{st} stage F-stat.	1,140	1,140	1,140	1,140	1,140	1,140	1,139
Observations	1,300	1,300	1,300	1,300	1,300	1,300	1,299
Panel C: IV for training completion							
Completed N4G program, self-reported	0.124	-0.031	0.077	0.055	0.059	0.063	0.101
	(0.037)	(0.037)	(0.037)	(0.039)	(0.030)	(0.028)	(0.034)
	[0.001]	[0.413]	[0.036]	[0.161]	[0.048]	[0.025]	[0.003]
1^{st} stage F-stat.	780	780	780	780	780	780	780
Observations	1,300	1,300	1,300	1,300	1,300	1,300	1,299
Panel D: IV for training days (5 days)							
N4G training days (self-reported)	0.008	-0.002	0.005	0.003	0.004	0.004	0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	[0.001]	[0.395]	[0.046]	[0.170]	[0.047]	[0.025]	[0.004]
1^{st} stage F-stat.	548	548	548	548	548	548	547
Observations	1,287	1,287	1,287	1,287	1,287	1,287	1,286
Control mean, base	-	-	-	-	-	-	-
Control mean, 6 months	0.380	0.365	0.279	0.259	0.757	0.751	0.682
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS and IV estimations assessing the effect of the N4G training on skills. Panel A displays results from OLS estimations and Panels B to D display results from IV estimations. IV estimations use treatment assignment as instrument for self-reported training start, training completion, and training days in units of 5 days. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.V.2. Treatment effects on business network.

	Business network	
	N° of potential employers	N° of potential employees
	(1)	(2)
Panel A: ITT		
N4G treatment (assigned)	0.328	0.338
	(0.136)	(0.180)
	[0.016]	[0.061]
Observations	1,299	1,299
Panel B: IV for training start		
Started N4G program, self-reported	0.573	0.590
	(0.238)	(0.313)
	[0.016]	[0.060]
1^{st} stage F-stat.	1,139	1,139
Observations	1,299	1,299
Panel C: IV for training completion		
Completed N4G program, self-reported	0.686	0.707
	(0.286)	(0.375)
	[0.016]	[0.060]
1^{st} stage F-stat.	780	780
Observations	1,299	1,299
Panel D: IV for training days (5 days)		
N4G training days (self-reported)	0.042	0.043
	(0.018)	(0.023)
	[0.017]	[0.066]
1^{st} stage F-stat.	547	547
Observations	1,288	1,288
Control mean, base	-	-
Control mean, 6 months	1.302	3.648
Occupation x Region FE	✓	✓

Note: Results from OLS and IV estimations assessing the effect of the N4G training on skills. Panel A displays results from OLS estimations and Panels B to D display results from IV estimations. IV estimations use treatment assignment as instrument for self-reported training start, training completion, and training days in units of 5 days. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets).

TABLE A.V.3. Treatment effects on job search.

	Jobsearch activity				
	N° of channels	N° applications	N° interviews	N° offers	N° employers
	(1)	(2)	(3)	(4)	(5)
Panel A: ITT					
N4G treatment (assigned)	0.038	-0.239	-0.076	0.089	0.115
	(0.072)	(0.128)	(0.066)	(0.069)	(0.093)
	[0.597]	[0.062]	[0.247]	[0.197]	[0.217]
Observations	1,299	1,296	1,298	1,298	1,297
Panel B: IV for training start					
Started N4G program, self-reported	0.066	-0.417	-0.133	0.156	0.201
	(0.125)	(0.223)	(0.114)	(0.120)	(0.162)
	[0.595]	[0.062]	[0.246]	[0.194]	[0.214]
1^{st} stage F-stat.	1,134	1,139	1,138	1,128	1,125
Observations	1,299	1,296	1,298	1,298	1,297
Panel C: IV for training completion					
Completed N4G program, self-reported	0.080	-0.499	-0.159	0.187	0.241
	(0.150)	(0.267)	(0.137)	(0.144)	(0.194)
	[0.595]	[0.062]	[0.246]	[0.194]	[0.215]
1^{st} stage F-stat.	775	779	779	770	774
Observations	1,299	1,296	1,298	1,298	1,297
Panel D: IV for training days (5 days)					
N4G training days (self-reported)	0.004	-0.029	-0.009	0.011	0.014
	(0.009)	(0.017)	(0.008)	(0.009)	(0.012)
	[0.634]	[0.075]	[0.266]	[0.232]	[0.249]
1^{st} stage F-stat.	541	548	551	544	547
Observations	1,286	1,283	1,285	1,285	1,284
Control mean, base	1.334	1.023	0.317	0.489	0.642
Control mean, 6m	2.231	1.499	0.605	0.519	0.836
Occupation-Region FE	✓	✓	✓	✓	✓

Note: Results from OLS and IV estimations assessing the effect of the N4G training on job search activity. Panel A displays results from OLS estimations and Panels B to D display results from IV estimations. IV estimations use treatment assignment as instrument for self-reported training start, training completion, and training days in units of 5 days. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets).

Appendix VI. Robustness checks

Multiple hypotheses testing.

TABLE A.VI.1. Multiple-hypothesis-testing adjusted p-values.

	P-values			
	Model (1)	Resample (2)	Romano-Wolf (3)	Holm's (4)
Employment probability, any occupation				
Any employment	0.205	0.209	0.667	1.000
Paid employment	0.258	0.264	0.706	1.000
Wage-employed	0.921	0.919	0.984	0.919
Self-employed	0.075	0.077	0.398	0.768
Unpaid employment	0.879	0.882	0.984	1.000
Total income	0.445	0.452	0.902	1.000
Main income	0.719	0.719	0.975	1.000
Employment probability, inside registered occupation				
Any employment	0.000	0.000	0.000	0.002
Paid employment	0.000	0.000	0.000	0.002
Wage-employed	0.002	0.002	0.029	0.035
Self-employed	0.000	0.000	0.000	0.001
Unpaid employment	0.201	0.199	0.667	1.000
Employment probability, outside registered occupation				
Any employment	0.004	0.005	0.044	0.064
Paid employment	0.025	0.028	0.187	0.342
Wage-employed	0.045	0.048	0.286	0.532
Self-employed	0.478	0.484	0.916	1.000
Unpaid employment	0.120	0.123	0.529	1.000
Employment quality				
Inc/hr	0.293	0.300	0.745	1.000
Inc¿0/hrs	0.275	0.281	0.738	1.000
Hours	0.569	0.571	0.822	1.000
Tenure (in months)	0.807	0.809	0.822	0.809
Written contract	0.064	0.070	0.343	0.490
Medical benefits	0.045	0.049	0.289	0.394
Pension	0.164	0.172	0.609	1.000
Paid days off	0.308	0.314	0.745	0.941
Job satisfaction	0.016	0.017	0.134	0.150
Living conditions				
Wellbeing	0.646	0.642	0.990	1.000
Anxiety	0.050	0.052	0.359	0.468
Depression	0.096	0.097	0.542	0.774
Stress	0.011	0.008	0.099	0.084
Marriage	0.005	0.004	0.054	0.044
Has children	0.597	0.607	0.990	1.000
Pregnancy	0.361	0.364	0.953	1.000
Living w/ partner	0.353	0.348	0.953	1.000
Financial independence	0.655	0.659	0.990	1.000
Bank account	0.003	0.002	0.030	0.030
Mobile money	0.768	0.769	0.990	1.000
SuSu	0.936	0.935	0.990	0.935

Note: Table shows the baseline p-values (1), the uncorrected p-values estimated by bootstrap (2), the Romano-Wolf corrected p-values (3), an the Holm's p-values (4) for each of the outcome variables. Underlying models include trade-region fixed effects and the outcome measured at baseline if available.

Sample attrition.

TABLE A.VI.2. Differential attrition by treatment status.

	Sample attrition	
	6 months follow-up	18 months follow-up
	(1)	(2)
N4G treatment (assigned)	-0.028	-0.026
	(0.018)	(0.025)
	[0.120]	[0.299]
Observations	1,445	779
Control mean	0.117	0.116
Occupation x Region FE	✓	
Region FE		✓

Note: Table shows OLS estimation results for the effect of treatment assignment on sample attrition in the endline (column (1)) and the follow-up (column (2)). Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.VI.3. Selective attrition by baseline characteristics and outcomes.

	6 months follow-up				18 months follow-up			
	Non-attriters	Attriters	Diff.	p-value	Non-attriters	Attriters	Diff.	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Socioeconomic characteristics at baseline								
Age	20.65	20.28	0.37	0.04	20.63	19.79	0.84	0.00
	(0.06)	(0.18)	(0.18)		(0.08)	(0.24)	(0.24)	
Married (binary)	0.41	0.37	0.05	0.27	0.38	0.34	0.04	0.04
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.06)	
Has children	0.20	0.28	-0.07	0.04	0.20	0.29	-0.08	0.19
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.05)	
Highest education: Primary	0.19	0.31	-0.12	0.00	0.21	0.24	-0.03	0.34
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.05)	
Highest education: JHS	0.31	0.31	-0.00	0.96	0.34	0.41	-0.08	0.00
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.05)	
Highest education: SHS	0.44	0.29	0.15	0.00	0.39	0.24	0.15	0.00
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.05)	
Outcome variables at baseline								
Paid employment	0.22	0.21	0.01	0.78	0.17	0.16	0.01	0.03
	(0.01)	(0.03)	(0.04)		(0.01)	(0.04)	(0.04)	
Wage-employed	0.16	0.14	0.03	0.42	0.12	0.11	0.00	0.42
	(0.01)	(0.03)	(0.03)		(0.01)	(0.04)	(0.04)	
Self-employed	0.06	0.08	-0.02	0.43	0.05	0.05	0.00	0.05
	(0.01)	(0.02)	(0.02)		(0.01)	(0.02)	(0.02)	
Monthly income (among all)	7.40	17.13	-9.74	0.00	6.37	8.76	-2.39	0.05
	(0.68)	(5.02)	(2.63)		(0.89)	(3.72)	(2.84)	
Monthly income (among employed)	34.24	80.14	-45.89	0.00	32.76	47.08	-14.32	0.23
	(2.57)	(19.93)	(10.12)		(3.84)	(17.38)	(12.56)	
Weekly hours (among all)	10.81	9.71	1.09	0.58	10.10	8.21	1.90	0.26
	(0.63)	(1.71)	(1.98)		(0.85)	(2.00)	(2.51)	
Weekly hours (among employed)	48.40	45.42	2.98	0.48	49.59	42.00	7.59	0.36
	(1.32)	(3.38)	(4.18)		(1.90)	(4.61)	(5.70)	
Written contract	0.11	0.15	-0.04	0.61	0.10	0.07	0.03	0.66
	(0.02)	(0.08)	(0.07)		(0.03)	(0.07)	(0.09)	
Distribution across program components								
Region: Accra	0.57	0.59	-0.02	0.66	0.54	0.70	-0.16	0.02
	(0.01)	(0.04)	(0.04)		(0.02)	(0.05)	(0.06)	
Region: Kumasi	0.19	0.25	-0.06	0.11	0.19	0.20	-0.00	0.91
	(0.01)	(0.04)	(0.03)		(0.02)	(0.04)	(0.05)	
Region: Tamale	0.24	0.17	0.08	0.04	0.26	0.10	0.16	0.00
	(0.01)	(0.03)	(0.04)		(0.02)	(0.03)	(0.05)	
Dressmaking	0.54	0.52	0.02	0.70	-	-	-	-
	(0.01)	(0.04)	(0.04)					
Beauty therapy	0.32	0.27	0.05	0.23	-	-	-	-
	(0.01)	(0.04)	(0.04)					
Hairdressing	0.14	0.21	-0.07	0.04	-	-	-	-
	(0.01)	(0.03)	(0.03)					
Joint F-stat.	-	-	-	0.342	-	-	-	0.178
N	1,300	145	1,445		681	98	779	

Note: Table shows averages for baseline using all observations. Observations with partially missing information on baseline-characteristics, baseline outcomes, and attriters were kept. The values displayed for the differences are the differences in means across attriters and non-attriters and their standard errors in parentheses. The p-values belong to a joint orthogonality test on the groups. Values displayed for F-stat are F-statistics for joint significance of all balance variables.

TABLE A.VI.4. Effects on employment probability with IPW.

	Employment probability					Income	
	Total employment	Paid employment	Wage-employed	Self-employed	Unpaid employment	Income, total	Income, main
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Economic activity in any occupation							
N4G treatment (assigned)	0.040	0.038	0.004	0.034	0.002	1.365	0.615
	(0.030)	(0.029)	(0.026)	(0.018)	(0.022)	(1.747)	(1.668)
	[0.186]	[0.193]	[0.886]	[0.065]	[0.913]	[0.435]	[0.712]
Observations	1,286	1,286	1,286	1,286	1,286	1,275	1,275
Control mean, base	0.218	0.178	0.109	0.069	0.041	7.635	7.376
Control mean, 6 months	0.490	0.340	0.251	0.089	0.150	13.204	12.553
Panel B: Economic activity inside registered occupation							
N4G treatment (assigned)	0.121	0.097	0.052	0.045	0.024	4.109	3.374
	(0.024)	(0.018)	(0.016)	(0.010)	(0.019)	(0.911)	(0.798)
	[0.000]	[0.000]	[0.001]	[0.000]	[0.203]	[0.000]	[0.000]
Observations	1,286	1,286	1,286	1,286	1,286	1,275	1,275
Control mean, base	0.010	0.003	0.003	0.000	0.008	0.022	0.001
Control mean, 6 months	0.165	0.066	0.056	0.010	0.099	1.511	1.377
Panel C: Economic activity outside registered occupation							
N4G treatment (assigned)	-0.081	-0.060	-0.047	-0.011	-0.021	-2.757	-2.753
	(0.027)	(0.026)	(0.023)	(0.016)	(0.013)	(1.574)	(1.525)
	[0.003]	[0.021]	[0.040]	[0.478]	[0.105]	[0.080]	[0.071]
Observations	1,286	1,286	1,286	1,286	1,286	1,275	1,275
Control mean, base	0.208	0.175	0.107	0.069	0.033	7.634	7.354
Control mean, 6 months	0.325	0.274	0.195	0.079	0.051	11.693	11.176
Occupation-Region FE	✓	✓	✓	✓	✓	✓	✓
IPWs	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on employment probability and income. In Panel A, the outcomes do not take into account in which occupation the employment takes place. In Panel B, the outcomes only take employment in the registered occupation into account. In Panel C, the outcomes only take employment outside the registered occupation into account. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.VI.5. Effects on job attributes with IPW.

	Inc/hr	Inc>0/hr	Hours	Tenure (month)	Written contract	Medical benefits	Pension	Paid days off	Job Satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N4G treatment (assigned)	0.034	0.049	-1.440	-0.137	0.065	0.052	0.035	0.038	0.057
	(0.035)	(0.142)	(1.859)	(1.272)	(0.040)	(0.027)	(0.020)	(0.035)	(0.023)
	[0.324]	[0.728]	[0.439]	[0.914]	[0.106]	[0.058]	[0.087]	[0.279]	[0.016]
Observations	665	464	665	629	528	535	535	535	665
Control mean, base	0.207	-0.030	13.544	5.757	0.025	-	-	-	0.307
Control mean, 6 months	0.181	0.125	50.834	13.851	0.242	0.069	0.044	0.150	0.347
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
IPWs	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on job attributes depending on individual-level baseline characteristics. Regressions are run among participants that are employed at the time of the 6-months follow-up. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.VI.6. Effect on living conditions with IPW.

	Wellbeing and mental health				Family				Finances			
	Wellbeing	Anxiety	Depression	Stress	Marriage	Has Children	Pregnancy	Living w/ partner	Financial indep.	Bank account	Mobile money	SuSu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
N4G treatment (assigned)	-0.007	-0.040	-0.029	-0.009	-0.083	-0.002	-0.016	-0.019	-0.013	0.066	0.003	-0.000
	(0.016)	(0.018)	(0.016)	(0.004)	(0.029)	(0.017)	(0.016)	(0.021)	(0.026)	(0.022)	(0.020)	(0.026)
	[0.666]	[0.024]	[0.073]	[0.008]	[0.004]	[0.905]	[0.323]	[0.371]	[0.612]	[0.003]	[0.864]	[0.989]
Observations	1,286	1,182	1,182	1,182	1,286	1,286	1,286	1,268	1,286	1,286	1,286	1,286
Control mean, base	-	0.270	0.254	0.049	0.421	0.208	0.000	0.114	0.099	0.096	0.713	0.137
Control mean, 6 months	0.525	0.355	0.287	0.063	0.574	0.264	0.084	0.212	0.261	0.198	0.830	0.259
Occupation-Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IPWs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on quality-of-life indicators. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

Spillovers.

TABLE A.VI.7. Effect of knowing someone who participated in N4G on employment outcomes in the control group.

	Employment probability					Income	
	Any employment (1)	Paid employment (2)	Inside reg. occupation (3)	Outside reg. occupation (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
N4G contacts	0.008	0.097	0.029	0.068	-0.090	3.523	4.421
	(0.052)	(0.048)	(0.025)	(0.046)	(0.037)	(2.780)	(2.680)
	[0.884]	[0.044]	[0.253]	[0.135]	[0.016]	[0.206]	[0.100]
Observations	398	398	398	398	398	398	398
Control mean	0.491	0.291	0.051	0.240	0.200	11.852	10.752
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of knowing someone who attended the N4G training on employment outcomes among study participants of the control group. Estimations include trade-region fixed effects and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

Additional controls.

TABLE A.VI.8. Effects on employment and income with additional controls.

	Employment probability					Income	
	Total employment (1)	Paid employment (2)	Wage-employed (3)	Self-employed (4)	Unpaid employment (5)	Income, total (6)	Income, main (7)
Panel A: Economic activity in any occupation							
N4G treatment (assigned)	0.041	0.035	0.003	0.032	0.006	1.072	0.364
	(0.030)	(0.029)	(0.026)	(0.018)	(0.022)	(1.741)	(1.666)
	[0.172]	[0.216]	[0.917]	[0.072]	[0.792]	[0.538]	[0.827]
Observations	1,299	1,299	1,299	1,299	1,299	1,275	1,275
Control mean, base	0.226	0.186	0.116	0.070	0.040	7.635	7.376
Control mean, 6 months	0.490	0.339	0.251	0.088	0.151	13.204	12.553
Panel B: Economic activity inside registered occupation							
N4G treatment (assigned)	0.114	0.090	0.048	0.042	0.024	3.855	3.152
	(0.024)	(0.018)	(0.016)	(0.010)	(0.018)	(0.896)	(0.803)
	[0.000]	[0.000]	[0.003]	[0.000]	[0.187]	[0.000]	[0.000]
Observations	1,299	1,299	1,299	1,299	1,299	1,275	1,275
Control mean, base	0.010	0.003	0.003	0.000	0.008	0.022	0.001
Control mean, 6 months	0.168	0.068	0.058	0.010	0.101	1.511	1.377
Panel C: Economic activity outside registered occupation							
N4G treatment (assigned)	-0.073	-0.055	-0.045	-0.010	-0.018	-2.800	-2.790
	(0.027)	(0.026)	(0.023)	(0.016)	(0.013)	(1.567)	(1.522)
	[0.007]	[0.033]	[0.047]	[0.541]	[0.147]	[0.074]	[0.067]
Observations	1,299	1,299	1,299	1,299	1,299	1,275	1,275
Control mean, base	0.216	0.183	0.113	0.070	0.033	7.634	7.354
Control mean, 6 months	0.322	0.271	0.193	0.078	0.050	11.693	11.176
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training in employment probability and income. In Panel A, the outcomes do not take into account in which occupation the employment takes place. In Panel B, the outcomes only take employment in the registered occupation into account. In Panel C, the outcomes only take employment outside the registered occupation into account. Models include occupation-region fixed effects as well as participants' age, marital status, employment status, education, and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.VI.9. Effects on job attributes with additional controls.

	Inc/hr	Inc>0/hr	Hours	Tenure (month)	Written contract	Medical benefits	Pension	Paid days off	Job Satisfaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
N4G treatment (assigned)	0.059	0.095	-1.459	-0.283	0.071	0.053	0.030	0.033	0.055
	(0.047)	(0.245)	(1.843)	(1.329)	(0.041)	(0.027)	(0.021)	(0.035)	(0.023)
	[0.216]	[0.701]	[0.429]	[0.832]	[0.080]	[0.051]	[0.161]	[0.339]	[0.017]
Observations	194	125	673	637	535	542	542	542	673
Control mean, base	0.200	-0.030	13.785	5.705	0.025	-	-	-	0.324
Control mean, 6 months	0.170	0.059	50.579	13.858	0.239	0.068	0.049	0.154	0.346
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of randomly assigned N4G treatment status on job attributes among study participants that are employed at the time of the 6 months follow-up. Models include occupation-region fixed effects as well as participants' age, marital status, employment status, education, and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

TABLE A.VI.10. Effect on living conditions with additional controls.

	Wellbeing and mental health				Family				Finances			
	Wellbeing	Anxiety	Depression	Stress	Marriage	Has Children	Preg-nancy	Living w/ partner	Financial indep.	Bank account	Mobile money	SuSu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
N4G treatment (assigned)	-0.006	-0.032	-0.026	-0.009	-0.078	-0.005	-0.014	-0.017	-0.011	0.064	0.001	-0.002
	(0.015)	(0.017)	(0.016)	(0.004)	(0.028)	(0.016)	(0.015)	(0.020)	(0.025)	(0.022)	(0.019)	(0.025)
	[0.687]	[0.071]	[0.102]	[0.011]	[0.006]	[0.754]	[0.377]	[0.391]	[0.670]	[0.004]	[0.955]	[0.938]
Observations	1,299	1,194	1,194	1,194	1,299	1,299	1,299	1,281	1,299	1,299	1,299	1,299
Control mean, base	-	0.268	0.255	0.049	0.417	0.211	0.000	0.113	0.098	0.095	0.714	0.138
Control mean, 6 months	0.525	0.353	0.286	0.063	0.570	0.269	0.083	0.213	0.261	0.196	0.829	0.256
Occupation x Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on quality-of-life indicators. Models include occupation-region fixed effects as well as participants' age, marital status, employment status, education, and the outcome measured at baseline if available. Robust standard errors are displayed in parentheses and p-values in squared brackets.

Appendix VII. Additional pre-registered outcomes and heterogeneities

TABLE A.VII.1. Treatment effects on additional pre-registered outcomes.

Livelihood	Eaten less	NHIS	Transactional sex	Live alone	Live shared, known	Live shared, unkown
	(1)	(2)	(3)	(4)	(5)	(6)
N4G treatment (assigned)	-0.018	-0.021	-0.034	-0.014	0.012	-0.007
	(0.031)	(0.021)	(0.028)	(0.012)	(0.013)	(0.008)
Observations	1,300	1,300	1,195	1,300	1,300	1,300
Control mean	0.481	0.840	0.302	0.040	0.955	0.020
Finances	Asset index	Money received	Money sent	N° of senders	N° of recipients	
	(7)	(8)	(9)	(10)	(11)	
N4G treatment (assigned)	-0.002	-2.776	-12.553	0.100**	0.047	
	(0.012)	(21.014)	(21.222)	(0.043)	(0.044)	
Observations	1,300	387	245	1,300	1,300	
Control mean	0.375	169.157	148.464	0.541	0.564	
Occupation x Region FE	✓	✓	✓	✓	✓	✓

Note: Results from OLS estimations assessing the effect of the N4G training on additional pre-registered indicators. Models include occupation-region fixed effects and the outcome measured at baseline if available. Robust standard errors in parentheses (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Appendix VIII. Bayesian Analysis

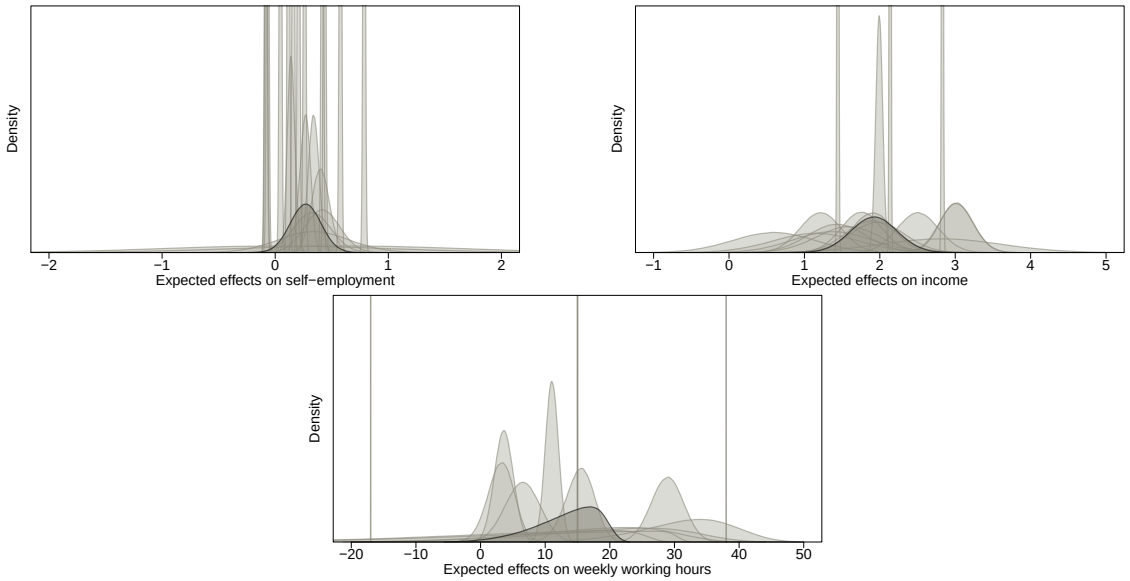
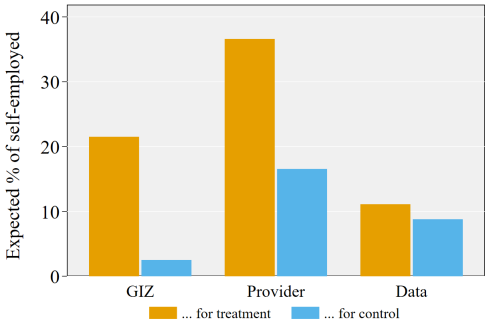
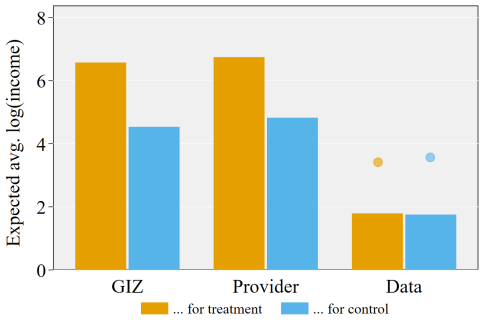


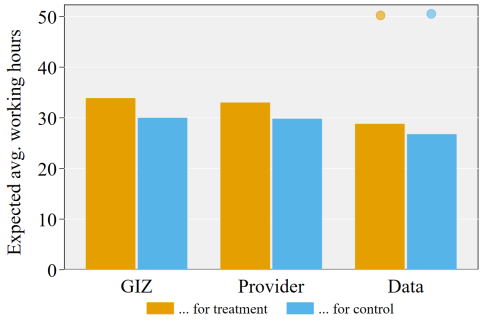
FIGURE A.VIII.1. Distribution of individual and aggregate prior expectations.
Notes: The upper left graph shows the distribution for the probability to be self-employed. The upper right graph shows the distribution for monthly income (logarithmized), and the lower middle graph the distribution for weekly working hours. In each graph the light gray distributions display the individual priors of each stakeholder and the dark gray distribution the aggregate prior across all stakeholders.



(A) Probability of self-employment.



(B) Monthly income.



(C) Weekly working hours.

FIGURE A.VIII.2. Average performance levels across treatment arms.
Notes: The upper left graph refers to the share of self-employment, the upper right graph refers to monthly income (logarithmized) and the lower middle graph refers to weekly working hours. In each graph the bars show the average performance levels for the treatment group in orange and the control group in blue as (i) expected by GIZ employees, (ii) expected by training providers, and (iii) observed in the data. The additional dots in the graps for income and working hours indicate the average performance levels observed in the data among employed study participants only.